=> FILE HCAPLUS
FILE 'HCAPLUS' ENTERED AT 12:33:57 ON 06 MAY 2004

FILE COVERS 1907 - 6 May 2004 VOL 140 ISS 19
FILE LAST UPDATED: 5 May 2004 (20040505/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

```
=> D QUE L27
L2            4 SEA FILE=REGISTRY ABB=ON  (25038-59-9/BI OR 9002-86-2/BI OR
                9002-88-4/BI OR 9003-07-0/BI)
L3         2093 SEA FILE=HCAPLUS ABB=ON  (L2 OR PVC OR POLYMER? OR PLASTIC? OR
                PE OR POLYURETHANE? OR THERMOPLASTIC? OR POLYETHYLENE OR
                POLYVINYL CHLORIDE OR THERMOSET? OR PP OR POLYPROPYLENE OR
                POLYSTYRENE OR POLYIMIDE? OR POLYCARBONATE? OR ACRYLIC?) AND
                NANOTUBE?
L4          693 SEA FILE=HCAPLUS ABB=ON  L3 AND COMPOSITE?
L5        13585 SEA FILE=HCAPLUS ABB=ON  NANOTUBE?(5A)CARBON
L6          619 SEA FILE=HCAPLUS ABB=ON  L4 AND L5
L7           66 SEA FILE=HCAPLUS ABB=ON  L6 AND (ALIGN? OR AXIS OR AXES)
L8            5 SEA FILE=HCAPLUS ABB=ON  L7 AND P/DT
L9           61 SEA FILE=HCAPLUS ABB=ON  L7 NOT L8
L10           3 SEA FILE=HCAPLUS ABB=ON  L9 NOT (1999 OR 2000 OR 2001 OR 2002
                OR 2003 OR 2004)/PY
L11           0 SEA FILE=HCAPLUS ABB=ON  L8 AND (1907-1998)/PRY,AY
L12           3 SEA FILE=HCAPLUS ABB=ON  L10 OR L11
L20          52 SEA FILE=HCAPLUS ABB=ON  L6 AND ORIENT?
L21           8 SEA FILE=HCAPLUS ABB=ON  L6 AND (EMI OR ELECTROMAGNETIC?)(5A)(S
                HIELD? OR PROTECT?)
L22          58 SEA FILE=HCAPLUS ABB=ON  L20 OR L21
L23          12 SEA FILE=HCAPLUS ABB=ON  L22 AND P/DT
L24          46 SEA FILE=HCAPLUS ABB=ON  L22 NOT L23
L25           2 SEA FILE=HCAPLUS ABB=ON  L24 NOT (1999-2004)/PY
L26           1 SEA FILE=HCAPLUS ABB=ON  L23 AND (1907-1998)/PRY,AY
L27           4 SEA FILE=HCAPLUS ABB=ON  L12 OR L25 OR L26
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=> FILE WPIX
FILE 'WPIX' ENTERED AT 12:34:09 ON 06 MAY 2004


```
FILE LAST UPDATED:            5 MAY 2004     <20040505/UP>
MOST RECENT DERWENT UPDATE:      200429       <200429/DW>
```

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DERWENT WORLD PATENTS INDEX SUBSCRIBER FILE, COVERS 1963 TO DATE

>>> FOR A COPY OF THE DERWENT WORLD PATENTS INDEX STN USER GUIDE,
    PLEASE VISIT:
 http://www.stn-international.de/training_center/patents/stn_guide.pdf <<<

>>> FOR DETAILS OF THE PATENTS COVERED IN CURRENT UPDATES, SEE
    http://thomsonderwent.com/coverage/latestupdates/           <<<

>>> FOR INFORMATION ON ALL DERWENT WORLD PATENTS INDEX USER
    GUIDES, PLEASE VISIT:
    http://thomsonderwent.com/support/userguides/               <<<

>>> NEW! FAST-ALERTING ACCESS TO NEWLY-PUBLISHED PATENT
    DOCUMENTATION NOW AVAILABLE IN DERWENT WORLD PATENTS INDEX
    FIRST VIEW - FILE WPIFV. FREE CONNECT HOUR UNTIL 1 MAY 2004.
    FOR FURTHER DETAILS: http://www.thomsonderwent.com/dwpifv  <<<

>>> NEW! IMPROVE YOUR LITIGATION CHECKING AND INFRINGEMENT
    MONITORING WITH LITALERT. FIRST ACCESS TO RECORDS OF IP
    LAWSUITS FILED IN THE 94 US DISTRICT COURTS SINCE 1973.
    FOR FURTHER DETAILS:
    http://www.thomsonscientific.com/litalert          <<<

>>> THE DISPLAY LAYOUT HAS BEEN CHANGED TO ACCOMODATE THE
    NEW FORMAT GERMAN PATENT APPLICATION AND PUBLICATION
    NUMBERS. SEE ALSO:
    http://www.stn-international.de/archive/stnews/news0104.pdf <<<

>>> SINCE THE FILE HAD NOT BEEN UPDATED BETWEEN APRIL 12-16
    THERE WAS NO WEEKLY SDI RUN  <<<

=> D QUE L19
L2            4 SEA FILE=REGISTRY ABB=ON  (25038-59-9/BI OR 9002-86-2/BI OR
                9002-88-4/BI OR 9003-07-0/BI)
L3         2093 SEA FILE=HCAPLUS ABB=ON  (L2 OR PVC OR POLYMER? OR PLASTIC? OR
                PE OR POLYURETHANE? OR THERMOPLASTIC? OR POLYETHYLENE OR
                POLYVINYL CHLORIDE OR THERMOSET? OR PP OR POLYPROPYLENE OR
                POLYSTYRENE OR POLYIMIDE? OR POLYCARBONATE? OR ACRYLIC?) AND
                NANOTUBE?
L4          693 SEA FILE=HCAPLUS ABB=ON  L3 AND COMPOSITE?
L5        13585 SEA FILE=HCAPLUS ABB=ON  NANOTUBE?(5A)CARBON
L6          619 SEA FILE=HCAPLUS ABB=ON  L4 AND L5
L13         105 SEA FILE=WPIX ABB=ON  L4 AND L5
L15          19 SEA FILE=WPIX ABB=ON  L13 AND (ORIENT? OR ALIGN? OR AXES OR
                AXIS)
L16          21 SEA FILE=WPIX ABB=ON  L6 AND (EMI OR ELECTROMAGNETIC?)
L17          11 SEA FILE=WPIX ABB=ON  L16 AND (SHIELD? OR PROTECT?)
L18          28 SEA FILE=WPIX ABB=ON  L15 OR L17
L19           6 SEA FILE=WPIX ABB=ON  L18 AND (1960-1998)/AY,PRY

=> FILE COMPENDEX
FILE 'COMPENDEX' ENTERED AT 12:34:20 ON 06 MAY 2004
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FILE LAST UPDATED: 4 MAY 2004       <20040504/UP>
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FILE COVERS 1970 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN
    THE BASIC INDEX >>>

=> D QUE L32
L2              4 SEA FILE=REGISTRY ABB=ON  (25038-59-9/BI OR 9002-86-2/BI OR
                  9002-88-4/BI OR 9003-07-0/BI)
L3           2093 SEA FILE=HCAPLUS ABB=ON  (L2 OR PVC OR POLYMER? OR PLASTIC? OR
                  PE OR POLYURETHANE? OR THERMOPLASTIC? OR POLYETHYLENE OR
                  POLYVINYL CHLORIDE OR THERMOSET? OR PP OR POLYPROPYLENE OR
                  POLYSTYRENE OR POLYIMIDE? OR POLYCARBONATE? OR ACRYLIC?) AND
                  NANOTUBE?
L4            693 SEA FILE=HCAPLUS ABB=ON  L3 AND COMPOSITE?
L5          13585 SEA FILE=HCAPLUS ABB=ON  NANOTUBE?(5A)CARBON
L28           267 SEA FILE=COMPENDEX ABB=ON  L4 AND L5
L29            44 SEA FILE=COMPENDEX ABB=ON  L28 AND (ORIENT? OR ALIGN? OR AXIS
                  OR AXES)
L30             0 SEA FILE=COMPENDEX ABB=ON  L28 AND (EMI OR ELECTROMAGNETIC?)AND
                   (SHIELD? OR PROTECT?)
L31            44 SEA FILE=COMPENDEX ABB=ON  L29 OR L30
L32             1 SEA FILE=COMPENDEX ABB=ON  L31 NOT (1999-2004)/PY

=> FILE INSPEC
FILE 'INSPEC' ENTERED AT 12:34:30 ON 06 MAY 2004
Compiled and produced by the IEE in association with FIZ KARLSRUHE
COPYRIGHT 2004 (c) INSTITUTION OF ELECTRICAL ENGINEERS (IEE)

FILE LAST UPDATED: 3 MAY 2004        <20040503/UP>
FILE COVERS 1969 TO DATE.

<<< SIMULTANEOUS LEFT AND RIGHT TRUNCATION AVAILABLE IN
    THE BASIC INDEX >>>

=> D QUE L33
L2              4 SEA FILE=REGISTRY ABB=ON  (25038-59-9/BI OR 9002-86-2/BI OR
                  9002-88-4/BI OR 9003-07-0/BI)
L3           2093 SEA FILE=HCAPLUS ABB=ON  (L2 OR PVC OR POLYMER? OR PLASTIC? OR
                  PE OR POLYURETHANE? OR THERMOPLASTIC? OR POLYETHYLENE OR
                  POLYVINYL CHLORIDE OR THERMOSET? OR PP OR POLYPROPYLENE OR
                  POLYSTYRENE OR POLYIMIDE? OR POLYCARBONATE? OR ACRYLIC?) AND
                  NANOTUBE?
L4            693 SEA FILE=HCAPLUS ABB=ON  L3 AND COMPOSITE?
L5          13585 SEA FILE=HCAPLUS ABB=ON  NANOTUBE?(5A)CARBON
L28           267 SEA FILE=COMPENDEX ABB=ON  L4 AND L5
L29            44 SEA FILE=COMPENDEX ABB=ON  L28 AND (ORIENT? OR ALIGN? OR AXIS
                  OR AXES)
L30             0 SEA FILE=COMPENDEX ABB=ON  L28 AND (EMI OR ELECTROMAGNETIC?)AND
                   (SHIELD? OR PROTECT?)
L31            44 SEA FILE=COMPENDEX ABB=ON  L29 OR L30
L33             5 SEA FILE=INSPEC ABB=ON  L31 NOT (1999-2004)/PY

=> FILE JICST
FILE 'JICST-EPLUS' ENTERED AT 12:37:34 ON 06 MAY 2004
COPYRIGHT (C) 2004 Japan Science and Technology Agency (JST)

FILE COVERS 1985 TO 26 APR 2004 (20040426/ED)
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THE JICST-EPLUS FILE HAS BEEN RELOADED TO REFLECT THE 1999 CONTROLLED
TERM (/CT) THESAURUS RELOAD.

=> D QUE L34
L2            4 SEA FILE=REGISTRY ABB=ON  (25038-59-9/BI OR 9002-86-2/BI OR
                9002-88-4/BI OR 9003-07-0/BI)
L3         2093 SEA FILE=HCAPLUS ABB=ON  (L2 OR PVC OR POLYMER? OR PLASTIC? OR
                PE OR POLYURETHANE? OR THERMOPLASTIC? OR POLYETHYLENE OR
                POLYVINYL CHLORIDE OR THERMOSET? OR PP OR POLYPROPYLENE OR
                POLYSTYRENE OR POLYIMIDE? OR POLYCARBONATE? OR ACRYLIC?) AND
                NANOTUBE?
L4          693 SEA FILE=HCAPLUS ABB=ON  L3 AND COMPOSITE?
L5        13585 SEA FILE=HCAPLUS ABB=ON  NANOTUBE?(5A)CARBON
L28         267 SEA FILE=COMPENDEX ABB=ON  L4 AND L5
L29          44 SEA FILE=COMPENDEX ABB=ON  L28 AND (ORIENT? OR ALIGN? OR AXIS
                OR AXES)
L30           0 SEA FILE=COMPENDEX ABB=ON  L28 AND (EMI OR ELECTROMAGNETIC?)AND
                 (SHIELD? OR PROTECT?)
L31          44 SEA FILE=COMPENDEX ABB=ON  L29 OR L30
L34           3 SEA FILE=JICST-EPLUS ABB=ON  L31 NOT (1999-2004)/PY

=> DUP REM L27 L19 L32 L33 L34
FILE 'HCAPLUS' ENTERED AT 12:38:11 ON 06 MAY 2004
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
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FILE 'WPIX' ENTERED AT 12:38:11 ON 06 MAY 2004

FILE 'COMPENDEX' ENTERED AT 12:38:11 ON 06 MAY 2004

FILE 'INSPEC' ENTERED AT 12:38:11 ON 06 MAY 2004

FILE 'JICST-EPLUS' ENTERED AT 12:38:11 ON 06 MAY 2004


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PROCESSING COMPLETED FOR L27
PROCESSING COMPLETED FOR L19
PROCESSING COMPLETED FOR L32
PROCESSING COMPLETED FOR L33
PROCESSING COMPLETED FOR L34
L35          14 DUP REM L27 L19 L32 L33 L34 (5 DUPLICATES REMOVED)

=> D ALL 1-14

L35  ANSWER 1 OF 14  WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN   2004-213487 [20]   WPIX
CR   2003-833477 [77]; 2004-030321 [03]
DNN  N2004-169145        DNC C2004-084571
```

TI Coating composition for **electromagnetic shielding** of object, e.g. paper, pipe, vehicle, comprises combination of carbon particles and metal-coated lightweight particles dispersed in water

emulsion **polymer** binder.
DC A82 G02 L03 P73 V04 W06
IN BOYD, R C; LEGRANDE, W B
PA (BOYD-I) BOYD R C; (LEGR-I) LEGRANDE W B
CYC 1
PI US 2004028859 A1 20040212 (200420)* 9 B32B001-08
ADT US 2004028859 A1 **CIP of US 1998-151445 19980911**, CIP of WO 2002-US7039 20020308, US 2003-358375 20030205
FDT US 2004028859 A1 CIP of US 6576336
PRAI US 2003-358375 20030205; **US 1998-151445 19980911**; WO 2002-US7039 20020308
IC ICM B32B001-08
AB US2004028859 A UPAB: 20040324
NOVELTY - A coating composition comprises a water emulsion **polymer** binder; a combination of carbon particles and metal-coated lightweight particles dispersed in the binder; and water. The carbon particles and metal-coated particles provide effective electrically conductive and **electromagnetic** radiation absorptive properties to the coating composition.

USE - For **electromagnetic shielding** of object, e.g. paper, cloth, **plastic** (**polycarbonate**, **acrylic** or nylon **plastic**), rubber, steel, **composite** material or pipe, **plastic** component of electronic device, room, building or other physical facility, aircraft, tank, ship or other vehicle, by applying a continuous coating to the object and allowing the composition to cure and dry to a hard coating surface (claimed).

ADVANTAGE - The coating composition has outstanding electrically conductive and **electromagnetic** radiation absorptive properties.
Dwg.0/0
FS CPI EPI GMPI
FA AB
MC CPI: A12-E01A; G02-A05A; G02-A05B; L03-G06
EPI: V04-U01; W06-B08; W06-C08

L35 ANSWER 2 OF 14 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2002:946613 HCAPLUS
DN 138:10792
ED Entered STN: 13 Dec 2002
TI **Carbon nanotube** deposition on magnetic adsorbents for molecular sieves
IN Zornes, David A.
PA USA
SO PCT Int. Appl., 108 pp.
CODEN: PIXXD2
DT **Patent**
LA English
IC ICM H01F001-11
CC 77-8 (Magnetic Phenomena)
Section cross-reference(s): 59, 66
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002099824	A2	20021212	WO 2002-US11968	20020416
	WO 2002099824	A3	20030220		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH,

PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ,
UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU,
TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,
CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,
BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
WO 2001078870 A1 20011025 WO 2001-US12369 20010416
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT,
LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU,
SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN,
YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,
DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,
BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
US 2002066368 A1 20020606 US 2001-898758 20010629 <--
US 6706097 B2 20040316

PRAI	WO 2001-US12369	A	20010416
	US 2001-898758	A	20010629
	WO 2001-US30744	A	20011001
	US 1998-114729P	P	19981231 <--
	US 1999-114917P	P	19990105
	US 1999-122153P	P	19990226
	US 1999-126589P	P	19990326
	US 1999-143899P	P	19990714
	US 1999-157342P	P	19991001
	US 1999-166900P	P	19991122
	US 1999-167969P	P	19991130
	WO 1999-US31291	A1	19991230
	US 2000-197359P	P	20000416
	US 2000-205799P	P	20000517
	US 2000-237408P	P	20001002

AB A mol. sieve apparatus and magnetic/adsorbent material composition facilitate mol.
absorption and sepns. using a magnetic field to hold, move, cool,and/or heat an adsorbent that is bonded to magnetic materials that are moveable by a magnetic field. An adsorbent is bonded to a soft magnetic material with a binder into a powder **composite** material adsorbent that is attractable by a magnetic field. This new **composite** powder is referred to hereinafter as a magnetoadsorbent. The magnetoadsorbent functions to adsorb and desorb working substances, causing a mol. separation; thus, increasing the efficiency of the absorption cycle by moving the adsorbent to a location that processes the adsorbent in the most optimized conditions. Magnetic field manipulation of adsorbents provides the ability to deliver mols. to locations within systems. Magnetoadsorbents of the present invention further increase the efficiency of the absorption cycle by combining materials with functions including:catalyst, buoyancy, suspension, magnetic heating, and sinking in liquid All Nano coupling magnetoadsorbent can adsorb in an **oriented** direction, because Co C **nanotubes** provide a structure to **orient** within a magnetic field.

ST **carbon nanotube** magnetic adsorbent mol sieve deodorants

IT **Polyimides**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(binders; **carbon nanotube** deposition on magnetic adsorbents for mol. sieves)

IT Binders

Composites
Foams
Magnetic separation
Molecular sieves
(**carbon nanotube** deposition on magnetic adsorbents for mol. sieves)

IT **Nanotubes**
(**carbon**; **carbon nanotube** deposition on magnetic adsorbents for mol. sieves)

IT Adsorbents
(magnetic; **carbon nanotube** deposition on magnetic adsorbents for mol. sieves)

IT Magnetic materials
(soft; **carbon nanotube** deposition on magnetic adsorbents for mol. sieves)

IT 7722-84-1, Hydrogen peroxide, uses
RL: NUU (Other use, unclassified); USES (Uses)
(**carbon nanotube** deposition on magnetic adsorbents for mol. sieves)

IT 7429-90-5, Aluminum, uses 7440-44-0, **Carbon**, uses 7440-48-4, Cobalt, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**carbon nanotube** deposition on magnetic adsorbents for mol. sieves)

L35 ANSWER 3 OF 14 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2002-526127 [56] WPIX
CR 2001-280442 [29]; 2001-475423 [51]; 2001-570153 [64]; 2002-236887 [29]
DNC C2002-148929
TI Solubilization of **carbon nanotubes** in selected organic solvent involves terminating **carbon nanotubes** with carboxylic acid groups and attaching aliphatic **carbon** chain to terminated **carbon nanotubes**.
DC E36 G01
IN CHEN, J; HADDON, R C; HAMON, M A
PA (KENT) UNIV KENTUCKY RES FOUND
CYC 1
PI US 6368569 B1 20020409 (200256)* 6 C09C001-56
ADT US 6368569 B1 **Provisional US 1998-102787P 19981002, Provisional US 1998-102909P 19981002,** US 1999-409787 19990930
PRAI US 1999-409787 19990930; **US 1998-102787P 19981002; US 1998-102909P 19981002**
IC ICM C09C001-56
ICS C07C061-09; C07C233-00
AB US 6368569 B UPAB: 20020903
NOVELTY - The **carbon nanotubes** are terminated with carboxylic acid groups. An aliphatic carbon chain is attached to the terminated **carbon nanotubes** so as to render **carbon nanotubes** soluble in selected organic solvent.
USE - For solubilizing **carbon nanotubes** in selected organic solvent. The solutions are useful in functionalizing chemistry of open ends, exterior walls or convex face and interior cavity or concave face of **nanotubes**, processing **nanotube** based **polymer**, copolymer and **composite** products, and devices used in aerospace, battery, fuel cell, health care and **electromagnetic** radiation **shielding**.
ADVANTAGE - The **carbon nanotubes** are completely solubilized in organic solvents.
Dwg.0/0

FS CPI
FA AB; DCN
MC CPI: E10-B04A2; E10-B04C; E10-B04C2; E10-C04L; E31-F05; E31-K07; G01-A11

L35 ANSWER 4 OF 14 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2001-570153 [64] WPIX
CR 2001-280442 [29]; 2001-475423 [51]; 2002-236887 [29]; 2002-526127 [56]
DNN N2001-424899 DNC C2001-169409
TI Method of solubilizing **carbon nanotubes** in organic solvent, involves dissolving **carbon nanotubes** with attached aliphatic **carbon** chain (which may contain aromatic residues) in organic solvent.
DC A41 A60 E19 E36 J04 L03 V04 X16
IN HADDON, R C; HAMON, M A
PA (HADD-I) HADDON R C; (HAMO-I) HAMON M A; (KENT) UNIV KENTUCKY RES FOUND
CYC 1
PI US 2001016608 A1 20010823 (200164)* 4 C09K003-00
US 6531513 B2 20030311 (200321) B01F017-00
ADT US 2001016608 A1 **Provisional US 1998-102787P 19981002, Provisional US 1998-102909P 19981002,** CIP of US 1999-409296 19990929, CIP of US 1999-409787 19990930, US 2001-795588 20010228; US 6531513 B2 **Provisional US 1998-102787P 19981002, Provisional US 1998-102909P 19981002,** CIP of US 1999-409296 19990929, CIP of US 1999-409787 19990930, US 2001-795588 20010228
FDT US 2001016608 A1 CIP of US 6187823; US 6531513 B2 CIP of US 6187823, CIP of US 6368569
PRAI US 2001-795588 20010228; **US 1998-102787P 19981002; US 1998-102909P 19981002;** US 1999-409296 19990929; US 1999-409787 19990930
IC ICM B01F017-00; C09K003-00
ICS B01F003-08
AB US2001016608 A UPAB: 20030328
NOVELTY - A method of solubilizing **carbon nanotubes** in an organic solvent, involves attaching an aliphatic carbon chain (which may contain aromatic residues) to **carbon nanotubes** and dissolving **carbon nanotubes** with attached aliphatic **carbon** chain (which may contain aromatic residues) in organic solvent.

USE - For solubilizing **carbon nanotubes** in an organic solvent. The solubilized **carbon nanotubes** are used as intermediates in the preparation of **polymers,** copolymers and **composite** material, and for devices in various industries including aero-space, battery fuel cell, healthcare and **electromagnetic** radiation **shielding.**

ADVANTAGE - A simple method of solubilizing **carbon nanotubes** is enabled. The resulting solution allows the study of functionalization chemistry of the open ends, the exterior walls or convex face and the interior cavity or concave face of **carbon nanotubes.** Processing of **nanotube** into intermediate in the preparation of **polymer,** copolymer and **composite** products, and devices in various industries including aero-space, battery fuel cell, healthcare and **electromagnetic** radiation **shielding,** is also enabled. Full length or unshortened **carbon nanotubes** are solubilized by a simple method which preserves the length of the **carbon nanotubes.** Introduction of carboxylic acid groups for solubilizing the **carbon nanotubes** is not necessary, due to direct interaction of the **carbon nanotubes** with a long chain amines such as octadecyl amine. The **carbon nanotubes** do not require

heat treatment and are used directly in the dissolution step. The **carbon nanotubes** are not subjected to strong acid and extra functionality is not introduced. The **carbon nanotubes** may be easily liberated from the amine by acidification. Treatment of solutions of the **carbon nanotube**-amine solvate with hydrochloric acid leads to precipitation of the unchanged **carbon nanotubes** due to protonation of the amine. The **carbon nanotubes** are introduced into **polymer** mixtures and blends to form films from which the amine is easily removed because it is not chemically bonded to **carbon nanotubes**
.
Dwg.0/0

FS CPI EPI
FA AB; DCN
MC CPI: A01-F; J04-X; L03-E04; L03-G
EPI: V04-U01; X16-C; X16-J

L35 ANSWER 5 OF 14 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2001-475423 [51] WPIX
CR 2001-280442 [29]; 2001-570153 [64]; 2002-236887 [29]; 2002-526127 [56]
DNC C2001-142486
TI Solutions of single walled **carbon nanotubes**, is obtained by dissolving **carbon nanotube** in specific solvent.
DC E36 L02 L03
IN CHEN, J; HADDON, R C
PA (CHEN-I) CHEN J; (HADD-I) HADDON R C; (KENT) UNIV KENTUCKY RES FOUND
CYC 1
PI US 2001010809 A1 20010802 (200151)* 16 D01F009-12
US 6641793 B2 20031104 (200374) D01F009-12
ADT US 2001010809 A1 **Provisional US 1998-102787P 19981002, Provisional US 1998-102909P 19981002**, CIP of US 1999-401668 19990922, US 2001-795957 20010228; US 6641793 B2 **Provisional US 1998-102787P 19981002, Provisional US 1998-102909P 19981002**, CIP of US 1999-401668 19990922, US 2001-795957 20010228
FDT US 6641793 B2 CIP of US 6331262
PRAI US 2001-795957 20010228; **US 1998-102787P 19981002; US 1998-102909P 19981002**; US 1999-401668 19990922
IC ICM D01F009-12
ICS C09C001-44
AB US2001010809 A UPAB: 20031117
NOVELTY - Solutions of single wall **carbon nanotube** (SWNT) is obtained by dissolving the **nanotubes** in a specific solvent.

DETAILED DESCRIPTION - Solutions of single wall **carbon nanotube** (SWNT) is obtained by dissolving the **nanotubes** in a solvent such as chloroform, dichloromethane, benzene, toluene, chlorobenzene, dichlorobenzene, dichlorocarbene, ether, tetrahydrofuran, trichlorobenzene, methylene chloride, diethylene glycol, dimethyl ether, carbon disulfide, tetrachlorocarbon, pyridine, quinoline, dichloroethane, diethyl ether, xylene, naphthalene or nitrobenzene.

USE - For determining functionalization chemistry of open ends, exterior walls or convex face and interior cavity or convex face of single walled **carbon nanotubes**. Also for processing **nanotube** based **polymer**, copolymer and **composite** products for application in various industries including aerospace, battery, fuel cell, health care and **electromagnetic** radiation **shielding**.

ADVANTAGE - Functionalization chemistry of SWNT can be determined through the study of ionic and covalent solution face chemistry with concomitant modulation of SWNT band structure. A novel and improved method for dissolving SWNT and semiconductors in common organic solvents is provided.
Dwg.0/12

FS CPI
FA AB; DCN
MC CPI: E05-U02; L02-H04; L03-E04; L03-G

L35 ANSWER 6 OF 14 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2000-375922 [32] WPIX
DNN N2000-282358 DNC C2000-113549
TI Crosslinked conducting **polymer composite** for use in applications such as an antistatic material contains dispersed conducting filler material which forms a continuous conductive network in the **composite**.
DC A17 A85 L03 V04 X12 X25
IN FOULGER, S H; QUINN, J M; TRIAL, T T; QUINN, J; TRIAL, T
PA (PIRE) PIRELLI CABLES & SYSTEMS LLC; (FOUL-I) FOULGER S H; (QUIN-I) QUINN J M; (TRIA-I) TRIAL T T
CYC 24
PI WO 2000024816 A1 20000504 (200032)* EN C08K003-10
RW: AT BE CH CY DE DK ES FI FR GB GR IE IT LU MC NL PT SE
W: AU BR CA NZ
AU 2000018079 A 20000515 (200039)
BR 9914756 A 20010710 (200142) C08K003-10
US 6284832 B1 20010904 (200154) C08K003-04
EP 1149126 A1 20011031 (200172) EN C08K003-10
R: AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
US 2002004556 A1 20020110 (200208) B32B027-00
US 6417265 B1 20020709 (200253) C08K003-04
US 6569937 B2 20030527 (200337) C08K003-04
AU 763136 B 20030717 (200356) C08K003-10
NZ 511221 A 20030829 (200365) C08K003-10
ADT WO 2000024816 A1 WO 1999-US24286 19991018; AU 2000018079 A AU 2000-18079 19991018; BR 9914756 A BR 1999-14756 19991018, WO 1999-US24286 19991018; US 6284832 B1 **US 1998-178140 19981023**; EP 1149126 A1 EP 1999-961521 19991018, WO 1999-US24286 19991018; US 2002004556 A1 **Cont of US 1998-178140 19981023**, US 2001-908926 20010719; US 6417265 B1 **CIP of US 1998-178140 19981023**, US 1999-406193 19990927; US 6569937 B2 **Cont of US 1998-178140 19981023**, US 2001-908926 20010719; AU 763136 B AU 2000-18079 19991018; NZ 511221 A NZ 1999-511221 19991018, WO 1999-US24286 19991018
FDT AU 2000018079 A Based on WO 2000024816; BR 9914756 A Based on WO 2000024816; EP 1149126 A1 Based on WO 2000024816; US 2002004556 A1 Cont of US 6284832; US 6569937 B2 Cont of US 6284832; AU 763136 B Previous Publ. AU 2000018079, Based on WO 2000024816; NZ 511221 A Based on WO 2000024816
PRAI US 1999-406193 19990927; **US 1998-178140 19981023**; US 2001-908926 20010719
IC ICM B32B027-00; C08K003-04; C08K003-10
ICS C08L031-04; H01B001-20
AB WO 200024816 A UPAB: 20000706
NOVELTY - A conducting **polymer composite** that is crosslinked comprises (a) a minor phase material comprising a semicrystalline **polymer** having a crystallinity from about 30-80% and having specified solubility parameter; (b) a conducting filler material dispersed in the minor phase; and (c) a major phase material having specified solubility parameter.

DETAILED DESCRIPTION - A conducting **polymer composite** that is crosslinked comprises:

(a) a minor phase material comprising a semicrystalline **polymer** having a crystallinity from about 30-80% and having a solubility parameter delta A, in Joules per cubic centimeter;

(b) a conducting filler material dispersed in the minor phase in an amount sufficient to be equal to or greater than an amount required to generate a continuous conducting network in the minor phase material;

(c) a major phase material having a solubility parameter delta B in Joules per cubic centimeter, the major phase material being a **polymer** which when mixed with the minor phase material will not engage in electrostatic interactions that promote miscibility, the major phase material having the minor phase material dispersed in it in an amount sufficient to be equal or greater than an amount required to generate a continuous conducting network in the major phase material, forming a conducting **polymer composite** having co-continuous phases which meets the following criteria for immiscibility (I) where 0.30 is greater or equal to (delta A - delta B)2 which is greater or equal to 0, and means for crosslinking of the conducting **polymer composite.**

INDEPENDENT CLAIMS are also included for the following:

(A) a conducting **polymer composite** that is crosslinked and as described above which has a means for crosslinking which comprises grafting members of the homologous series of Si(OR)3 to the backbone of the major phase material prior to dispersing the minor phase material in it;

(B) a method of producing a conducting **polymer composite** that is crosslinked which comprises mixing a minor phase semicrystalline **polymer** as described above, adding a conducting filler in an amount as described above, mixing the conducting filler and the semicrystalline **polymer** for a time and at a sufficient speed to insure a uniform distribution of the conducting filler in the semicrystalline **polymer** thereby forming a binary **composite** having a melting temperature, mixing a major phase as described above and having a melting temperature with the binary **composite** in a mixer preheated to at least the melting temperature of the major phase material and the melting temperature of the binary **composite** for a time and at a sufficient speed to insure a uniform distribution of the binary **composite** in the major phase material such that a wt ratio of the binary **composite** to the major phase material is sufficient to generate a continuous conducting network as described above and crosslinking the conducting **polymer composite;**

(C) a method which further comprises the step of mixing a second major phase material having a melting temperature with the conducting **polymer composite** in a mixer preheated to above the melting temperature of the second major phase material using a method as described above such that a quaternary conducting **polymer composite** with co-continuous phases is formed.

USE - The conductive material is used in antistatic materials, low temperature heaters, **electromagnetic** radiation **shielding** and electric field grading applications.

ADVANTAGE - The material is crosslinked by physical or chemical means. The minor and major phases do not engage in electrostatic interactions which promote miscibility. The amount of conducting material is minimized while a continuous conductive network is supported. The co-continuous **polymer** blend is formed using the percolation-in-percolation approach or multiple percolation techniques. The materials are particularly useful in environments where exposure to

chemicals could solvate and deteriorate a **thermoplastic** version of the **composite** or in high temperature environments where the **composite** may be exposed to temperature exceeding the m.pt. of the **composite** constituents.
Dwg.0/0

FS CPI EPI
FA AB
MC CPI: A04-G02B; A04-G07; A07-A02C; A08-M09A; A09-A03; L03-A02E
EPI: V04-U01; V04-X01B; X12-D01X; X25-B01B

L35 ANSWER 7 OF 14 WPIX COPYRIGHT 2004 THOMSON DERWENT on STN
AN 2000-239408 [21] WPIX
DNN N2000-179761 DNC C2000-073034
TI Field emission device e.g., flat panel display, travelling wave tubes used in microwave power amplifiers includes adherent single-walled and/or multi-walled **carbon nanotube** films disposed on relatively flat conductive substrates.
DC L03 V05
IN BOWER, C A; ZHOU, O; ZHU, W
PA (LUCE) LUCENT TECHNOLOGIES INC; (UYNC-N) UNIV NORTH CAROLINA; (AGER-N) AGERE SYSTEMS INC
CYC 29

PI	EP 989579	A2	20000329	(200021)*	EN	15	H01J001-30
	R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI						
	JP 2000141056	A	20000523	(200033)		15	B23K020-00
	CA 2280234	A1	20000321	(200035)	EN		H01J019-02
	KR 2000023347	A	20000425	(200107)			B82B003-00
	US 6630772	B1	20031007	(200374)			H01J001-62
	CA 2280234	C	20040106	(200406)	EN		H01J019-02

ADT EP 989579 A2 EP 1999-307243 19990914; JP 2000141056 A JP 1999-266103 19990920; CA 2280234 A1 CA 1999-2280234 19990813; KR 2000023347 A KR 1999-40668 19990921; US 6630772 B1 **Provisional US 1998-101203P 19980921**, US 1999-296572 19990422; CA 2280234 C CA 1999-2280234 19990813
PRAI US 1999-296572 19990422; **US 1998-101203P 19980921**
IC ICM B23K020-00; B82B003-00; H01J001-30; H01J001-62; H01J019-02
ICS B05D007-24; B81B001-00; C01B031-02; C01B031-30; H01J001-304; H01J009-02; H01J029-04; H01J031-12; H01J063-04; H01L021-28; H01L021-283; H03F003-58
AB EP 989579 A UPAB: 20000502
NOVELTY - Adherent **carbon nanotube** films (containing single-walled and/or multi-walled **nanotubes**) are disposed on relatively flat conductive substrates.
DETAILED DESCRIPTION - A device comprises: a substrate; and an adherent **carbon nanotube** film on the substrate.
INDEPENDENT CLAIMS are also included for the following:
(A) A process for fabricating a device which comprises disposing an adherent **carbon nanotube** film on the substrate.
(B) A process for fabricating a device which comprises:
(i) providing a substrate comprising at least one material selected from carbon-dissolving elements, carbide-forming elements and low melting point materials;
(ii) disposing **carbon nanotubes** on the substrate;
and
(iii) heating the substrate to induce at least one of: reaction of at least part of the **nanotubes** with the **carbon**-dissolving elements, reaction of at least part of the **nanotubes** with the

carbide forming elements, and melting of at least part of the low melting point materials.

(C) A process for fabricating a device which comprises spraying a dispersion of **carbon nanotubes** in a solvent at a substrate to coat the substrate surface with the **nanotubes.**

(D) A process for fabricating a device which comprises disposing a **carbon nanotube** film on the substrate while applying an electric field and/or magnetic field, so that at least 50 volume% of the **nanotubes** of the film are **aligned** in substantially the same direction.

(E) A process for fabricating a device which comprises:

(i) mixing **carbon nanotubes** with a **polymer** to form a **composite** material;

(ii) subjecting the **composite** material to a uniaxial load above its softening temperature, and releasing the load below its softening temperature, such that at least 50 volume% of the **nanotubes** of the film are **aligned** in substantially the same direction; and

(iii) disposing the **composite** material on the substrate.

USE - **Carbon nanotube** emitters are incorporated into vacuum microelectronic devices such as flat panel displays, klystrons, travelling wave tubes used in microwave power amplifiers, ion guns, electron beam lithography and high energy accelerators.

ADVANTAGE - The device has an improved **carbon nanotube** film, due to the **nanotube** film's strong adherence to the substrate and optional **alignment** in a substantially uniform manner. The **nanotube** emitters show desirable properties e.g., low threshold voltage (about 3 - 4 V/ microns m or less at a current density of 10 mA/cm2), high current densities (greater than 0.2 A/cm2) and excellent reproducibility and durability. The emitting characteristics appear to remain the same even after the emitting surface is exposed to air for several months.

Dwg.0/8

FS CPI EPI
FA AB
MC CPI: L03-C02
EPI: V05-B03B

L35 ANSWER 8 OF 14 INSPEC (C) 2004 IEE on STN
AN 1999:6119399 INSPEC DN A1999-03-8140N-030
TI Transmission electron microscopy observations of fracture of single-wall **carbon nanotubes** under axial tension.
AU Lourie, O.; Wagner, H.D. (Dept. of Mater. & Interfaces, Weizmann Inst. of Sci., Rehovot, Israel)
SO Applied Physics Letters (14 Dec. 1998) vol.73, no.24, p.3527-9. 11 refs.
Doc. No.: S0003-6951(98)03950-3
Published by: AIP
Price: CCCC 0003-6951/98/73(24)/3527(3)/$15.00
CODEN: APPLAB ISSN: 0003-6951
SICI: 0003-6951(19981214)73:24L.3527:TEMO;1-0
DT Journal
TC Experimental
CY United States
LA English
AB Well-**aligned** bundles of single-wall **carbon nanotubes** under tensile stresses were observed to fracture in real-time by transmission electron microscopy. The expansion of elliptical holes in the **polymer** matrix results in a tensile force in bridging **nanotubes.** The **polymer** matrix at both ends of

the bundles deforms extensively under the tension force, and fracture of the **nanotubes** occurs in tension within the **polymer** hole region rather than in shear within the gripping **polymer** region at the ends of the bundles. This provides evidence of significant **polymer-nanotube** wetting and interfacial adhesion.

CC A8140N Fatigue, embrittlement, and fracture; A6220M Fatigue, brittleness, fracture, and cracks; A6148 Structure of fullerenes and fullerene-related materials; A8190 Other topics in materials science; A6140K Structure of polymers, elastomers, and plastics

CT ADHESION; **CARBON NANOTUBES; COMPOSITE** MATERIAL INTERFACES; FILLED **POLYMERS**; FRACTURE; INTERNAL STRESSES; NONCRYSTALLINE DEFECTS; TRANSMISSION ELECTRON MICROSCOPY

ST **single-wall C nanotubes**; fracture; axial tension; TEM observation; tensile stresses; transmission electron microscopy; **well-aligned bundles**; elliptical holes; **polymer matrix**; tensile force; **bridging nanotubes**; **polymer hole region** ; **polymer-nanotube wetting**; interfacial adhesion; C

CHI C int, C el

ET C

L35 ANSWER 9 OF 14 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 1

AN 1998:545008 HCAPLUS

DN 129:276804

ED Entered STN: 27 Aug 1998

TI **Alignment** of **carbon nanotubes** in a **polymer** matrix by mechanical stretching

AU Jin, L.; Bower, C.; Zhou, O.

CS University of North Carolina at Chapel Hill, Chapel Hill, NC, 27599, USA

SO Applied Physics Letters (1998), 73(9), 1197-1199
CODEN: APPLAB; ISSN: 0003-6951

PB American Institute of Physics

DT Journal

LA English

CC 37-5 (Plastics Manufacture and Processing)

AB We report a method to fabricate **polymer**-based **composites** with **aligned carbon nanotubes**, and a procedure to determine the **nanotube orientation** and the degree of **alignment**. The **composites** were fabricated by casting a suspension of **carbon nanotubes** in a solution of a **thermoplastic polymer** and chloroform. They were uniaxially stretched at 100 °C and were found to remain elongated after removal of the load at room temperature The **orientation** and the degree of **alignment** were determined by x-ray diffraction. The dispersion and the **alignment** of the **nanotubes** were also studied by transmission electron microscopy.

ST **carbon nanotube alignment polymer**

IT **Nanotubes**
Nanotubes
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(**carbon** fibers; **alignment** of **carbon nanotubes** in a **polymer** matrix by mech. stretching)

IT **Carbon** fibers, properties
Carbon fibers, properties
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(**nanotube; alignment** of **carbon nanotubes** in a **polymer** matrix by mech. stretching)

IT Polyethers, properties

Polyethers, properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(polyamine-; **alignment** of **carbon nanotubes** in a **polymer** matrix by mech. stretching)

IT Polyamines
Polyamines
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(polyether-; **alignment** of **carbon nanotubes** in a **polymer** matrix by mech. stretching)

RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Ajayan, P; Science 1994, V265, P1212 HCAPLUS
(2) de Heer, W; Science 1995, V270, P1179 HCAPLUS
(3) Ebbesen, T; Nature (London) 1992, V358, P16
(4) Endo, M; J Phys Chem Solids 1993, V54, P1841 HCAPLUS
(5) Falvo, M; Nature (London) 1997, V389, P582 MEDLINE
(6) Iijima, S; Nature (London) 1991, V354, P56 HCAPLUS
(7) Odom, T; Nature (London) 1998, V391, P62 HCAPLUS
(8) Reznik, D; Phys Rev B 1995, V52, P116 HCAPLUS
(9) Terrones, M; Nature (London) 1997, V388, P52 HCAPLUS
(10) Thess, A; Science 1996, V273, P483 HCAPLUS
(11) Wang, X; Appl Phys Lett 1993, V62, P1881 HCAPLUS
(12) Wildoer, J; Nature (London) 1998, V391, P59 HCAPLUS
(13) Wong, E; Science 1997, V277, P1971 HCAPLUS
(14) Zhou, O; Science 1994, V263, P1744 HCAPLUS

L35 ANSWER 10 OF 14 HCAPLUS DUPLICATE 2
AN 1998:638805 HCAPLUS
DN 129:325181
ED Entered STN: 09 Oct 1998
TI **Carbon nanotubes**: synthesis, processing and intercalation
AU Zhou, O.; Bower, C.; Jin, L.; Suzuki, S.; Tanigaki, K.
CS Univ. of North Carolina Chapel Hill, Chapel Hill, NC, 27590-3255, USA
SO Proceedings - Electrochemical Society (1998), 98-8(Recent Advances in the Chemistry and Physics of Fullerenes and Related Materials), 885-896
CODEN: PESODO; ISSN: 0161-6374
PB Electrochemical Society
DT Journal
LA English
CC 78-1 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 37
AB Single-walled **carbon nanotubes** (SWNTs) were synthesized by ablating a graphite target mixed with metal catalysts with a pulsed Nd:YAG laser. The quality and nature of the SWNTs produced depended sensitively on the ablation conditions. The average **nanotube** diameter was found to shift with the ablation laser frequency and the gas flow rate. **Carbon nanotube/polymer composites** were fabricated by solution casting. A method was developed to **align** the **nanotubes** inside the **polymer** matrix with controllable **orientation** and degree of **alignment**. SWNTs were intercalated with alkali metals and HNO_3 mols. Intercalation and in-situ TEM/EELS measurements were also performed on individual **nanotube** bundles. Guest species can be reversibly intercalated to the interstitial sites between the **nanotubes**.
ST **carbon nanotube** prepn **alignment**

intercalation; **polymer** matrix **carbon nanotube alignment**; cesium intercalation **carbon nanotube** ; nitric acid intercalation **carbon nanotube**

IT **Nanotubes**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); RACT (Reactant or reagent)
(**carbon**; preparation of **carbon nanotubes** by laser ablation of graphite mixed with Ni/Co catalyst, **nanotube alignment** in **polymer** matrix and intercalation with alkali metals or HNO3)

IT Intercalation
(of **carbon nanotubes** with alkali metals or nitric acid)

IT Polyethers, properties
Polyethers, properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(polyamine-; **alignment** of **carbon nanotubes** in poly(hydroxyamino ether) matrix)

IT Polyamines
Polyamines
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(polyether-; **alignment** of **carbon nanotubes** in poly(hydroxyamino ether) matrix)

IT 7440-46-2DP, Cesium, intercalation compound with **carbon nanotubes**, preparation 7697-37-2DP, Nitric acid, intercalation compound with **carbon nanotubes**, preparation
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(intercalation of **carbon nanotubes** with alkali metals or HNO3)

RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Ajayan, P; Science 1994, V265, P1212 HCAPLUS
(2) Bower, C; Applied Physics A 1998, VA66, P1
(3) Bower, C; Chem Phys Lett 1998, V288, P481 HCAPLUS
(4) Cowley, J; Chem Phys Lett 1997, P379 HCAPLUS
(5) Dai, H; Chem Phys Lett 1996, V260, P471 HCAPLUS
(6) de Heer, W; Science 1995, V270, P1179 HCAPLUS
(7) Ebbesen, T; Nature 1992, V358, P16
(8) Endo, M; J Phys Chem Solids 1993, V54, P1841 HCAPLUS
(9) Iijima, S; Nature 1991, V354, P56 HCAPLUS
(10) Jin, L; Appl Phys Lett in press
(11) Journet, C; Nature 1997, V388, P756 HCAPLUS
(12) Lee, R; Nature 1997, V388, P255 HCAPLUS
(13) Rao, A; Nature 1997, V388, P257 HCAPLUS
(14) Rao, A; Science 1997, V275, P187 HCAPLUS
(15) Suzuki, S; Chem Phys Lett 1998, V285, P230 HCAPLUS
(16) Thess, A; Science 1996, V273, P483 HCAPLUS
(17) Touzain, P; Synthetic Metals 1979, V1, P3 HCAPLUS
(18) Zhou, O; Nature 1991, V351, P462 HCAPLUS
(19) Zhou, O; Science 1994, V263, P1744 HCAPLUS

L35 ANSWER 11 OF 14 JICST-EPlus COPYRIGHT 2004 JST on STN
AN 980635105 JICST-EPlus
TI Discussion on the Mechanical Behavior of **Carbon Nanotube** /C60 **Composite** Based on Observation of Interfacial Structure.
AU KUZUMAKI T; HAYASHI T; MIYAZAWA K; ICHINOSE H; ITO K; ISHIDA Y

CS Univ. Tokyo, Tokyo, JPN
SO Mater Trans JIM (Jpn Inst Met), (1998) vol. 39, no. 5, pp. 578-581.
Journal Code: G0668A (Fig. 8, Ref. 7)
ISSN: 0916-1821
CY Japan
DT Journal; Article
LA English
STA New
AB The effects of the interfacial fine structure (interfacial bonding interaction) on the mechanical properties of **nanotube**/C60 **composite** were examined by high resolution transmission electron microscope (HRTEM) observations of **nanotube**/vapor-deposited C60 crystal interfaces and pull-out tests of high modulus carbon fiber with a vapor-deposited C60 single crystal. Interfaces between **nanotube** and {111}-faceted C60 crystal were observed to possess a parallel **orientation** relationship between the tube **axis** and <110> of the C60 crystal. The shear strength of the carbon fiber/C60 **composite** was estimated to be 4.4*10-2 MPa. Interfacial sliding was observed in the carbon fiber/C60 single crystal interface without deformation of the C60 matrix nor the fracture of fiber. It has been inferred that the pull-out of the carbon fiber from the C60 matrix is due to the shear sliding, which is caused by the weak bonding between graphitic basal plane and C60. The experiments have indicated that the ductility of the **nanotube**/C60 **composite** originates probably from sliding at the interface between the **nanotube** and the C60 matrix. (author abst.)
CC BH090300; CD01010D (539.18/.19CLUSTER; 546)
CT molecular cluster; carbon; nanostructure; surface structure; crystal **orientation**; carbon fiber; shear strength; slip(mechanics); pull-out test; **plastic** deformation; ductility; facet; micro structure; **composite** material; interface(surface); **nanotube**; fullerene C60; nanocomposites
BT molecule; second row element; element; carbon group element; structure; **orientation**(direction); carbon material; inorganic material; material; inorganic man made fiber; man-made fiber; fiber; high temperature fiber; mechanical property; property; strength; phenomena in strength of material; phenomenon; material testing; test; deformation; face; fullerene

L35 ANSWER 12 OF 14 INSPEC (C) 2004 IEE on STN DUPLICATE 3
AN 1998:5950717 INSPEC DN A9815-8120-011
TI Processing of ductile **carbon nanotube**/C60 **composite**.
AU Kuzumaki, T.; Hayashi, T.; Miyazawa, K.; Ichinose, H.; Ito, K.; Ishida, Y.
(Dept. of Mater. Sci., Tokyo Univ., Japan)
SO Materials Transactions, JIM (May 1998) vol.39, no.5, p.574-7. 8 refs.
Published by: Japan Inst. Metals
CODEN: TJIMAA ISSN: 0916-1821
SICI: 0916-1821(199805)39:5L.574:PDCN;1-F
DT Journal
TC Experimental
CY Japan
LA English
AB A new carbon/carbon (C/C) **composite** was successfully produced at room temperature by drawing a silver tube containing **carbon nanotubes** as the fiber material and nanocrystalline carbon 60 (C60) as the matrix. Fine structures of the **composite** were examined by transmission electron microscopy (TEM) and the mechanical properties by conventional tensile tests. TEM observations have shown that

the **carbon nanotubes** in the **composite** are not damaged and well **aligned** along the longitudinal direction of the **composite** wire. The stress-strain curve of the **composite** wire de-sheathed by the evaporation of silver through a heat treatment exhibited an approximately 20-fold increase in fracture stress over that of polycrystalline C60, and the higher fracture strain (more than 10%). The fractured surface of the wire showed that **nanotubes** have been pulled out but not fractured. The experiments lead us to a new concept of a ductile C/C **composite.**

CC A8120 Other methods of preparation of materials; A6220M Fatigue, brittleness, fracture, and cracks; A8140N Fatigue, embrittlement, and fracture; A6220F Deformation and plasticity; A8140G Other heat and thermomechanical treatments; A8140L Deformation, plasticity and creep; A6170L Slip, creep, internal friction and other indirect evidence of dislocations; A8140E Cold working, work hardening; post-deformation annealing, recovery and recrystallisation; textures; A7830G Infrared and Raman spectra in inorganic crystals

CT CARBON; **COMPOSITE** MATERIALS; DRAWING (MECHANICAL); FRACTURE; FULLERENES; HEAT TREATMENT; MATERIALS PREPARATION; NANOSTRUCTURED MATERIALS; **PLASTIC** DEFORMATION; RAMAN SPECTRA; SCANNING ELECTRON MICROSCOPY; SLIP; STRESS-STRAIN RELATIONS; TENSILE STRENGTH; TRANSMISSION ELECTRON MICROSCOPY; WORK HARDENING

ST **ductile C nanotube/C60 composite;** transmission electron microscopy; TEM; conventional tensile tests; mechanical properties; heat treatment; fracture strain; **ductile C/C composite;** C-C60

CHI CC60 el, C60 el, C el

ET C; C-C60

L35 ANSWER 13 OF 14 JICST-EPlus COPYRIGHT 2004 JST on STN

AN 970459245 JICST-EPlus

TI Structure and Deformation Behavior of **Carbon Nanotubes** Reinforced Nanocrystalline C60 **Composite.**

AU KUZUMAKI TOORU; HAYASHI TAKUYA; ICHINOSE HIDEKI; MIYAZAWA KUN'ICHI; ITO KUNIO; ISHIDA YOICHI

CS Univ. of Tokyo, Grad. Sch.

SO Nippon Kinzoku Gakkaishi (Journal of the Japan Institute of Metals), (1997) vol. 61, no. 4, pp. 319-325. Journal Code: G0023A (Fig. 14, Ref. 24)
CODEN: NIKGAV; ISSN: 0021-4876

CY Japan

DT Journal; Article

LA Japanese

STA New

AB **Carbon nanotube** reinforced nanocrystalline C60 was prepared at room temperature by drawing the **composite** sheathed in silver tube. Fine structures of the **composite** were examined by high resolution electron microscopy (HREM) and the mechanical properties by conventional tensile tests. HREM observation shows that **carbon nanotubes** in the **composite** are defect free and **aligned** well in the direction of the wire. The stress-strain curve of the **composite** wire de-sheathed by evaporation of silver through heat treatment gives approximately 20 times increase in the fracture stress over that of polycrystalline C60 with higher fracture strain (over 10%). The fracture surface of the wire shows that **nanotubes** were pulled out but not fractured. TEM observation of interface structure of C60 vapor deposited **nanotubes** as well as pull-out tests were performed of C60 single crystals vapor-deposited on single high elasticity carbon fibers which have similar surface structure as **nanotube** to examine the origin

of the large elongation of the **composite.** It has been inferred that shear deformation takes place in the carbon fiber/C60 single crystal interface with little deformation of matrix but without fracture of the fiber and that the pull out was mainly caused by the shear deformation, which was probably made possible by a weak interaction between graphitic basal plane and C60. The experiments lead us to a new concept of a ductile C/C **composite.** (author abst.)

CC BH090300; CD01010D (539.18/.19CLUSTER; 546)

CT carbon; molecular cluster; nanostructure; **composite** material; fiber reinforcement; rupture strength; drawing(**plastic** working); **plastic** deformation; interface(surface); stress strain characteristic; microcrystal; fullerene C60; **nanotube**

BT second row element; element; carbon group element; molecule; structure; material; strengthening; modification; mechanical property; property; strength; operation(processing); **plastic** working; working and processing; deformation; face; characteristic; crystal; solid(matter); fullerene

L35 ANSWER 14 OF 14 HCAPLUS COPYRIGHT 2004 ACS on STN DUPLICATE 4

AN 1994:632240 HCAPLUS

DN 121:232240

ED Entered STN: 12 Nov 1994

TI **Aligned carbon nanotube** arrays formed by cutting a **polymer** resin-**nanotube composite**

AU Ajayan, P. M.; Stephan, O.; Colliex, C.; Trauth, D.

CS Lab. Phys. Solides, Univ. Paris-sud, Orsay, 91405, Fr.

SO Science (Washington, DC, United States) (1994), 265(5176), 1212-14
CODEN: SCIEAS; ISSN: 0036-8075

DT Journal

LA English

CC 37-6 (Plastics Manufacture and Processing)

AB A simple technique is described that produces **aligned** arrays of C **nanotubes.** The **alignment** method is based on cutting thin slices (50-200 nm) of a **nanotube-polymer composite.** With this parallel and well-separated configuration of **nanotubes** it should be possible to measure individual tube properties and to demonstrate applications. The results demonstrate the nature of rheol., on nanometer scales, in **composite** media and flow-induced anisotropy produced by the cutting process. The fact that **nanotubes** do not break and are straightened after the cutting process also suggests that they have excellent mech. properties.

ST **carbon nanotube** formation epoxy resin; cutting epoxy **carbon nanotube nanotube**

IT **Polymer** morphology
(**aligned carbon nanotube** arrays formed by cutting epoxy resin-**nanotube composite**)

IT Epoxy resins, properties
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PROC (Process); USES (Uses)
(**aligned carbon nanotube** arrays formed by cutting epoxy resin-**nanotube composite**)

IT 7440-44-0, **Carbon**, properties
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(**aligned carbon nanotube** arrays formed by cutting epoxy resin-**nanotube composite**)

IT 158596-06-6, Dodecenylsuccinic anhydride-Epon 812-methyl nadic anhydride copolymer
RL: PEP (Physical, engineering or chemical process); POF (Polymer in

formulation); PRP (Properties); PROC (Process); USES (Uses)
(**aligned carbon nanotube** arrays formed by
cutting epoxy resin-**nanotube composite**)

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=> file reg
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=> display history full l1-

     FILE 'HCAPLUS'
L1       112585 SEA EM OR E(W)M OR ELECTROMAG? OR ELECTRO(2A)(MAG# OR
                MAGNET?)
L2        13922 SEA NANOTUBE# OR NANOTUBING# OR NANOTUBUL? OR NANOTUBIFOR
                M? OR (NANO? OR NM)(2A)(TUBE# OR TUBING# OR TUBUL? OR
                TUBIFORM?)
L3         3266 SEA BULK?(3A)(COND# OR CONDUCT?)
L4              QUE COND# OR CONDUCT?
L5          127 SEA L1 AND L2
L6            0 SEA L5 AND L3
L7           39 SEA L5 AND L4
L8              QUE POLYM# OR POLYMER? OR COPOLYM# OR COPOLYMER? OR
                TERPOLYM# OR TERPOLYMER? OR HOMOPOLYM# OR HOMOPOLYMER?
                OR RESIN?
L9           20 SEA L7 AND L8
L10        5982 SEA L1(3A)(SHIELD? OR JACKET? OR HOUSING# OR CASING# OR
                ENCAS? OR ISOLAT? OR BARRIER?)
L11          12 SEA L7 AND L10
L12          10 SEA L9 AND L11
L13          35 SEA GLATKOWSKI P?/AU
L14          13 SEA L13 AND (L1 OR L2 OR L3 OR L4)
L15           5 SEA L14 AND (1907-1998/PRY OR 1907-1998/PY)
L16           7 SEA L13 AND L2
L17      591503 SEA PLASTIC? OR THERMOPLASTIC? OR THERMOSET?
L18             QUE (35 OR 36 OR 37 OR 38)/SC,SX
L19          23 SEA L5 AND L18
L20      290520 SEA (ELEC# OR ELECTRIC?)(3A)(COND# OR CONDUCT?)
L21      218747 SEA ESD OR ELECTROSTAT? OR ELECTRO(2A)STATIC? OR
                STATIC?(2A)(ELEC# OR ELECTRIC? OR CHARG? OR DISCHARG?)
                OR (ELEC# OR ELECTRIC?)(2A)(CHARG? OR DISCHARG?)
L22        3551 SEA NANOTECH? OR (NANO? OR NM)(2A)(TECH# OR TECHNOL?)
L23      267563 SEA DIELEC?
L24      372670 SEA RUBBER?
L25        1153 SEA SWNT OR DWNT OR MWNT
L26         156 SEA (L2 OR L25 OR L22) AND L1
L27           0 SEA L26 AND L3
L28          45 SEA L26 AND L4
L29          42 SEA L26 AND (L8 OR L17 OR L18)
L30          27 SEA L26 AND L10
L31          31 SEA L26 AND L20
L32          14 SEA L26 AND L21
L33          22 SEA L26 AND L23
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L34            11 SEA L26 AND L24
L35            27 SEA L11 OR L12 OR L32 OR L34
L36            37 SEA (L9 OR L19 OR L30 OR L33) NOT L35
L37            25 SEA (L7 OR L28 OR L29 OR L31) NOT (L35 OR L36)
L38             0 SEA L35 AND (1907-1998/PRY OR 1907-1998/PY)
L39             4 SEA L36 AND (1907-1998/PRY OR 1907-1998/PY)
L40             5 SEA L37 AND (1907-1998/PRY OR 1907-1998/PY)
```

=> file hcaplus
FILE 'HCAPLUS'

=> d l39 1-4 ibib abs hitind

L39 ANSWER 1 OF 4 HCAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1999:811170 HCAPLUS
DOCUMENT NUMBER: 132:39343
TITLE: Synthesis of free-standing and aligned carbon **nanotubes**
INVENTOR(S): Ren, Zhifeng; Huang, Zhongping; Wang, Jui H.; Wang, Dezhi
PATENT ASSIGNEE(S): The Research Foundation of State University of New York, USA
SOURCE: PCT Int. Appl., 68 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

```
     PATENT NO.        KIND  DATE          APPLICATION NO.   DATE
     ---------------   ----  --------      ---------------   --------
     WO 9965821         A1   19991223      WO 1999-US13648   19990618 <--
         W:  CA, JP, KR, MX
         RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC,
             NL, PT, SE
     CA 2335449         AA   19991223      CA 1999-2335449   19990618 <--
     EP 1089938         A1   20010411      EP 1999-928735    19990618 <--
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
             PT, IE, FI
     JP 2002518280      T2   20020625      JP 2000-554654    19990618 <--
     US 2003203139      A1   20031030      US 1999-336126    19990618 <--
PRIORITY APPLN. INFO.:                  US 1998-89965P    P 19980619 <--
                                        US 1998-99708P    P 19980910 <--
                                        WO 1999-US13648   W 19990618
```

AB One or more highly-oriented, multi-walled carbon **nanotubes** are grown on an outer surface of a substrate initially disposed with a catalyst film or catalyst nano-dot by plasma enhanced hot filament

chem. vapor deposition of a carbon source gas (C2H2) and a catalyst gas (NH3) at 300-3000.degree.C. The carbon **nanotubes** have diam. 4-500 nm and length 0.1-50 .mu.m depending on growth conditions. Carbon **nanotube** d. can exceed to 104 **nanotubes**/mm2. Plasma intensity, carbon source gas to catalyst gas ratio and their flow rates, catalyst film thickness, and temp. of chem. vapor deposition affect the length, diam., d., and uniformity of the carbon **nanotubes**. The carbon **nanotubes** are useful in electrochem. applications as well as in electron emission, structural composites, material storage, and microelectrode applications.

IC ICM C01B031-00
ICS C01B031-02; D01F009-12; D01F009-127; C23C016-00; C23C016-26; C23C016-30; H01J001-30; H01M004-02

CC 57-8 (Ceramics)
Section cross-reference(s): 49, 52, 63, 72, 76, 78

ST carbon **nanotube** synthesis aligned free standing; **nanotube** synthesis carbon hot filament plasma CVD

IT **Nanotubes**
(carbon; synthesis of free-standing and aligned carbon **nanotubes**)

IT Films
Films
(ceramic; synthesis of free-standing and aligned carbon **nanotubes**)

IT Ceramics
Ceramics
(films; synthesis of free-standing and aligned carbon **nanotubes**)

IT Fuel cells
(hydrogen-storage units; synthesis of free-standing and aligned carbon **nanotubes**)

IT Drug delivery systems
(**nanotubes**; synthesis of free-standing and aligned carbon **nanotubes**)

IT Vapor deposition process
(plasma, hot-filament; synthesis of free-standing and aligned carbon **nanotubes**)

IT Glass, processes
(plates; synthesis of free-standing and aligned carbon **nanotubes**)

IT Battery electrodes
Cathodes
Electromagnetic shields
Field emission cathodes
Microelectrodes
Nanocomposites
Nanostructures
Superconductors
(synthesis of free-standing and aligned carbon **nanotubes**)

IT Cobalt alloy, base

Iron alloy, base
Nickel alloy, base
(caps, films; synthesis of free-standing and aligned carbon **nanotubes**)

IT 7439-89-6, Iron, uses 7440-02-0, Nickel, uses 7440-48-4, Cobalt, uses
(caps, films; synthesis of free-standing and aligned carbon **nanotubes**)

IT 7440-06-4, Platinum, uses
(films; synthesis of free-standing and aligned carbon **nanotubes**)

IT 7631-86-9, Silica, processes 14808-60-7, Quartz, processes
(films; synthesis of free-standing and aligned carbon **nanotubes**)

IT 1304-82-1, Bismuth telluride 1314-91-6, Lead telluride
1333-74-0, Hydrogen, processes 7439-93-2, Lithium, processes
7440-69-9, Bismuth, processes
(**nanotubes** contg.; synthesis of free-standing and aligned carbon **nanotubes**)

IT 7664-41-7, Ammonia, uses 7727-37-9, Nitrogen, uses
(synthesis of free-standing and aligned carbon **nanotubes**)

IT 71-43-2, Benzene, processes 74-85-1, Ethylene, processes
74-86-2, Acetylene, processes
(synthesis of free-standing and aligned carbon **nanotubes**)

IT 7440-21-3, Silicon, processes
(wafers; synthesis of free-standing and aligned carbon **nanotubes**)

REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L39 ANSWER 2 OF 4 HCAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1999:1792 HCAPLUS
DOCUMENT NUMBER: 130:142892
TITLE: Effective medium theory of the microwave and the infrared properties of composites with carbon **nanotube** inclusions
AUTHOR(S): Lakhtakia, Akhlesh; Slepyan, Gregory Ya.; Maksimenko, Sergey A.; Gusakov, Anton V.; Yevtushenko, Oleg M.
CORPORATE SOURCE: CATMAS-Computational and Theoretical Materials Sciences Group, Department of Engineering Science and Mechanics, Pennsylvania State University, University Park, PA, 16802-1401, USA
SOURCE: Carbon (**1998**), 36(12), 1833-1839
CODEN: CRBNAH; ISSN: 0008-6223
PUBLISHER: Elsevier Science Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Carbon **nanotubes** (CNs) are elec. small particles at IR and

microwave frequencies. The Mossotti-Clausius formalism for estg. the effective permittivity dyadic of a dil. composite contg. CN inclusions is described, and simplifications for certain orientational statistics are discussed. The polarizability dyadic of an elec. small CN is estd. from that of an infinitely long CN of the same cross-sectional diam. A collection of randomly dispersed, aligned, nonchiral, elec. small CNs is shown to be transparent in the axial direction, but it can be either opaque or transparent in the transverse plane. Its effective **electromagnetic** response properties can be manipulated by a biasing magnetic field.

CC 57-8 (Ceramics)
Section cross-reference(s): 73, 76, 78

ST **dielec** property carbon **nanotube** inclusion composite; microwave IR property carbon **nanotube** inclusion composite; polarizability carbon **nanotube** inclusion composite

IT Optical transmission
(IR; effective medium theory of microwave and IR properties of composites with carbon **nanotube** inclusions)

IT Composites
(carbon **nanotube**-contg.; effective medium theory of microwave and IR properties of composites with carbon **nanotube** inclusions)

IT **Nanotubes**
(carbon, in composites; effective medium theory of microwave and IR properties of composites with carbon **nanotube** inclusions)

IT Microwave
(characteristics; effective medium theory of microwave and IR properties of composites with carbon **nanotube** inclusions)

IT Opacity
Transparency
(directional; effective medium theory of microwave and IR properties of composites with carbon **nanotube** inclusions)

IT **Dielectric** constant
Polarizability
(effective medium theory of microwave and IR properties of composites with carbon **nanotube** inclusions)

filed after

REFERENCE COUNT: 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L39 ANSWER 3 OF 4 HCAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1998:602481 HCAPLUS
DOCUMENT NUMBER: 129:267168
TITLE: Silver-filled carbon **nanotubes** used as spectroscopic enhancers
AUTHOR(S): Garcia-Vidal, F. J.; Pitarke, J. M.; Pendry, J. B.
CORPORATE SOURCE: Facultad de Ciencias, Departamento de Fisica

Teorica de la Materia Condensada, Universidad Autonoma de Madrid, Madrid, 28049, Spain

SOURCE: Physical Review B: Condensed Matter and Materials Physics (**1998**), 58(11), 6783-6786
CODEN: PRBMDO; ISSN: 0163-1829
PUBLISHER: American Physical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The authors analyze from a theor. point of view the optical properties of arrays of C **nanotubes** filled with Ag. Dependence of these properties on the different parameters involved was studied using a transfer matrix formalism able to work with tensor-like **dielec**. functions and including the full **electromagnetic** coupling between the **nanotubes**. These structures exhibit very strong linear optical response and ✓ hence could be used as spectroscopic enhancers or chem. sensors in the visible range. Very localized surface plasmons, created by the **electromagnetic** interaction between the capped Ag cylinders, are responsible for this enhancing ability. Enhancements of up to 106 in the Raman signal of mols. absorbed on these arrays could be obtained.

CC 73-2 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76

ST silver filled carbon **nanotube** spectroscopic enhancer

IT **Nanotubes**
(carbon; silver-filled carbon **nanotubes** used as spectroscopic enhancers)

IT Surface plasmon
(localized; silver-filled carbon **nanotubes** used as spectroscopic enhancers)

IT **Dielectric** function
Optical properties
Optical reflection
Sensors
(silver-filled carbon **nanotubes** used as spectroscopic enhancers)

IT Raman spectroscopy
(silver-filled carbon **nanotubes** used as spectroscopic enhancers and their applications)

IT 7440-22-4, Silver, properties
(silver-filled carbon **nanotubes** used as spectroscopic enhancers)

REFERENCE COUNT: 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L39 ANSWER 4 OF 4 HCAPLUS
ACCESSION NUMBER: 1997:364098 HCAPLUS
DOCUMENT NUMBER: 127:127997
TITLE: Effective medium theory of the optical

properties of aligned carbon **nanotubes**

AUTHOR(S): Garcia-Vidal, F. J.; Pitarke, J. M.; Pendry, J. B.
CORPORATE SOURCE: Condensed Matter Theory Group, The Blackett Laboratory, Imperial College, London, SW7 2BZ, UK

SOURCE: Physical Review Letters (**1997**), 78(22), 4289-4292
CODEN: PRLTAO; ISSN: 0031-9007
PUBLISHER: American Physical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB We present an effective medium theory to analyze the reported optical properties of aligned carbon **nanotube** films. This methodol. is based on photonic band structure calcns. and allows treatment of complex media consisting of particles that interact strongly. We also develop a simple Maxwell-Garnett type approach for studying this system. In comparing the results of both mean field theories, we demonstrate that the inclusion of the full **electromagnetic** coupling between the **nanotubes**, as our numerical scheme does, is necessary for a complete explanation of the exptl. data.

i.e, conductive

CC 73-2 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 78

ST optical property model aligned carbon **nanotube**; graphite **nanotube** photonic band structure

IT **Nanotubes**
(carbon; effective medium theory for optical properties of aligned carbon **nanotubes**)

IT Optical properties
(effective medium theory for optical properties of aligned carbon **nanotubes**)

IT Mean-field theory
Simulation and Modeling, physicochemical
(optical properties of aligned carbon **nanotubes**)

IT **Dielectric** constant
(optical; of aligned carbon **nanotubes**)

IT Band structure
(photonic; effective medium theory for optical properties of aligned carbon **nanotubes**)

IT Optical materials
(photonic; optical properties of aligned carbon **nanotubes**)

IT 7440-44-0, Carbon, properties
(**nanotubes**; effective medium theory for optical properties of aligned carbon **nanotubes**)

=> d l40 1-5 ibib abs hitind

L40 ANSWER 1 OF 5 HCAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 2001:502406 HCAPLUS
DOCUMENT NUMBER: 135:84061
TITLE: Optical antenna array for harmonic generation, mixing and signal amplification
INVENTOR(S): Crowley, Robert Joseph
PATENT ASSIGNEE(S): USA
SOURCE: U.S., 10 pp.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE	
US 6258401	B1	20010710	US 2000-523626		20000313	<--
PRIORITY APPLN. INFO.:			US 1997-36085P	P	19970116	<--

AB Optical frequency antenna device fabrication is described entailing providing substrate materials, depositing metal oxide regions on the substrate materials with the metal oxide regions having an elec. length less than a light wavelength, and, growing elongated linear structures having an elec. length equal to a light wavelength on the metal oxide region. Wavelength selective light responsive array of **conductive** linear elements fabrication is also described entailing the steps of providing substrate materials, depositing metal oxide regions on the substrate materials, the metal oxide regions having elec. length less than a light wavelength, and growing a first group of **conductive** linear elements having an elec. length equal to a first light wavelength, growing a second group of **conductive** linear elements having an elec. length equal to a second light wavelength. Methods of modifying light waves are also described entailing providing substrate materials, depositing metal oxide regions on the substrate materials, the metal oxide regions having an elec. length less than a light wave length, and growing elongated linear structures having an elec. length equal to a light wavelength upon the metal oxide regions, providing an elec. signal to the substrate materials, and collecting, modifying and emitting energies at a light wavelength at the linear structures and the metal oxide regions. Nonlinear junctions of small dimension are used to rectify an alternating waveform induced upon the **conductors** by the lightwave **electromagnetic** energy. The optical antenna and junctions produce harmonic energy at light wavelengths. The linear **conductors** may be comprised of C **nanotubes** that are attached to the substrate materials, which may be connected to an elec. port.

IC ICM B05D005-12
NCL 427126300
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76
IT **Nanotubes**
(carbon; optical antenna array for harmonic generation and mixing

and signal amplification)
REFERENCE COUNT: 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L40 ANSWER 2 OF 5 HCAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 2000:418521 HCAPLUS
TITLE: The electrical field irradiation cathode and the **electromagnetic** wave generator which uses that. [Machine Translation].
INVENTOR(S): Yokoo, Kuniyoshi
PATENT ASSIGNEE(S): Tohoku University, Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 5 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2000173446	A2	20000623	JP 1998-351459	19981210 <--

PRIORITY APPLN. INFO.: JP 1998-351459 19981210 <--

AB [Machine Translation of Descriptors]. The constitution which can generate the electron beam which is modulated at optional frequency inside the zone whose to far-infrared zone is wide from the sub milli-wave zone which centers on the terahertz band efficiently being simple, the small-sized electrical field irradiation cathode and the **electromagnetic** wave generator are offered. Irradiating the laser radiation 2 the laser radiation or frequency of polar short pulse differs from laser radiation source 12 to the acicular projection 11 A which, on the surface of cathode component 11 is provided in array condition the electron which is excited, makes emit with the intense electric field by the direct galvanic electricity source 15 for the electrical field irradiation which connects with the cathode component and gate electrode 14 from the cathode surface with quantum-mechanics tunnel effect. The **electromagnetic** wave operating mutually this electron beam, in high frequency circuit, generates the **electromagnetic** wave. The semiconductor hetero structure whose three-dimensional selection excitation of the P type semiconductor and the intrinsic semiconductor and the electron whose electronic excitation to the **conduction** band is possible with optical excitation is possible, the quantum well and the super lattice, the quantum dot where the selection excitation with the energy of the lighting illuminant is possible, hurrah can consist the surface of cathode component 11, low dimension super structure of ream and the carbon **nano- tube** et cetera.

IC ICM H01J001-34
ICS H01J001-304; H01J023-04; H01J023-06; H01L029-66; H03B009-01

L40 ANSWER 3 OF 5 HCAPLUS COPYRIGHT 2003 ACS on STN

ACCESSION NUMBER: 1998:245226 HCAPLUS
DOCUMENT NUMBER: 129:11105
TITLE: Electronic and **electromagnetic** properties of **nanotubes**
AUTHOR(S): Slepyan, Gregory Ya.; Maksimenko, Sergey A.; Lakhtakia, Akhlesh; Yevtushenko, Oleg M.; Gusakov, Anton V.
CORPORATE SOURCE: Institute of Nuclear Problems, Belarus State University, Bobruiskaya str. 11, Minsk, 220050, Belarus
SOURCE: Physical Review B: Condensed Matter and Materials Physics (**1998**), 57(16), 9485-9497
CODEN: PRBMDO; ISSN: 0163-1829
PUBLISHER: American Physical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB A **nanotube** is phenomenol. modeled as a chain of atoms wrapped helically on a right circular cylinder. The semiclassical Hamiltonian of an electron is derived, using the Wannier approach for the Schrodinger equation, when the **nanotube** is exposed to both const. (d.c.) and high-frequency (a.c.) **electromagnetic** fields. The Boltzmann kinetic equation is then solved in the framework of momentum-independent relaxation time approxn. An anal. expression for elec. current in a **nanotube** is derived. The interaction of nonlinearity and chirality is analyzed, chiefly as the dependence of a current chiral angle on the amplitude of the a.c. elec. field. The derived expressions for the electronic transport also help in stating anisotropic impedance boundary conditions on the **nanotube** surface. Surface wave propagation in a C **nanotube** (CN) was examd. The idea of using CN's as nanowaveguides in the IR frequency range is established. Convective instability occurs under special conditions in a CN exposed to an axial d.c. elec. field.

conduct

CC 76-1 (Electric Phenomena)
Section cross-reference(s): 65, 73
ST carbon **nanotube** elec transport waveguide; **electromagnetic** wave propagation carbon **nanotube**; IR waveguide carbon **nanotube**; surface impedance carbon **nanotube**
IT Optical waveguides
(IR; electronic and **electromagnetic** properties of **nanotubes**)
IT **Nanotubes**
(carbon; electronic and **electromagnetic** properties of **nanotubes**)
IT Surface wave
Surface wave
(**electromagnetic**, propagation; electronic and **electromagnetic** properties of **nanotubes**)
IT **Electric conductivity**
Electric current

Hamiltonian
Simulation and Modeling, physicochemical
Surface impedance
(electronic and **electromagnetic** properties of **nanotubes**)

IT Chirality
(electronic and **electromagnetic** properties of **nanotubes** in relation to)

IT **Electromagnetic** wave
Electromagnetic wave
(surface, propagation; electronic and **electromagnetic** properties of **nanotubes**)

IT 7440-44-0, Carbon, properties
(electronic and **electromagnetic** properties of **nanotubes**)

REFERENCE COUNT: 59 THERE ARE 59 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L40 ANSWER 4 OF 5 HCAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1994:38549 HCAPLUS
DOCUMENT NUMBER: 120:38549
TITLE: Electronic properties of bucky-tube model
AUTHOR(S): Yamabe, Tokio; Okahara, Kenji; Okada, Mayumi; Tanaka, Kazuyoshi
CORPORATE SOURCE: Fac. Eng., Kyoto Univ., Kyoto, 606-01, Japan
SOURCE: Synthetic Metals (**1993**), 56(2-3), 3142-7
CODEN: SYMEDZ; ISSN: 0379-6779
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Electronic properties of bucky tube modelled by a sheet of helical graphite cylinder named "grahelix" have been examd. based on the one-dimensional tight-binding crystal orbital method in the framework of the Huckel approxn. It has been found that there are two types of grahelix depending on the helical pitch, i.e., one is energetically stable and semiconductive whereas the other less stable with metallic nature. Moreover the authors elucidate that such metallic tubes are equiv. to those involving plural nos. of isolated cis-type polyacetylene skeletons arranged mostly in a helical manner on the tube surface. Such helical polyacetylene skeletons guarantee the metallic **conduction** path to the electrons near the Fermi level (spiralons). Control of the flow of these spiralons may open up a stage for **nanotechnol**. of the electronic devices such as mol. solenoid applicable to mol. **electromagnet**, mol. elec. generator and so on.

CC 65-3 (General Physical Chemistry)

L40 ANSWER 5 OF 5 HCAPLUS COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER: 1993:656681 HCAPLUS
DOCUMENT NUMBER: 119:256681
TITLE: Why some bucky tubes would be metallic?

```
AUTHOR(S):               Tanaka, Kazuyoshi; Okahara, Kenji; Okada,
                         Mayumi; Yamabe, Tokio
CORPORATE SOURCE:        Fac. Eng., Kyoto Univ., Kyoto, 606-01, Japan
SOURCE:                  Fullerene Science and Technology (1993
                         ), 1(2), 137-44
                         CODEN: FTECEG; ISSN: 1064-122X
DOCUMENT TYPE:           Journal
LANGUAGE:                English
AB   As a reply to the title question, it has been elucidated that
     metallic bucky tubes are equiv. to those involving plural nos. of
     isolated polyacetylene(PA) skeletons (cis-type) arranged either in a
     helical or non-helical manner on the tube surface.  Such helical PA
     skeletons guarantee the metallic conduction path to the
     electrons near the Fermi level (spiralons).  Control of the flow of
     these spiralons may open up a stage for nano-
     technol. of the electronic devices such as mol. solenoid
     applicable to mol. electromagnet, mol. elec. generator and
     so on.
CC   65-1 (General Physical Chemistry)
     Section cross-reference(s): 76
ST   bucky tube metallic cond; carbon bucky tube cluster
IT   Electric conductors
        (bucky tubes)


=> d his l41-

     FILE 'HCAPLUS'
L41       1839 S (L2 OR L25 OR L22) AND (L1 OR L20 OR L21 OR L23)
L42         26 S L26 AND (1907-1998/PRY OR 1907-1998/PY)
L43         17 S L42 NOT (L39 OR L40)
L44        301 S L41 AND (1907-1998/PRY OR 1907-1998/PY)
L45        975 S L41 AND L20
L46        506 S L41 AND L21
L47        383 S L41 AND L23
L48          5 S L45 AND L46 AND L47
L49          1 S L48 AND (1907-1998/PRY OR 1907-1998/PY)
L50          1 S L49 NOT (L39 OR L40 OR L43)


=> d l50 1 ibib abs hitind

L50  ANSWER 1 OF 1  HCAPLUS  COPYRIGHT 2003 ACS on STN
ACCESSION NUMBER:        1997:299870  HCAPLUS
DOCUMENT NUMBER:         127:56097
TITLE:                   Excitons in carbon nanotubes
AUTHOR(S):               Ando, Teuneya
CORPORATE SOURCE:        Inst. Solid State Physics, Univ. Tokyo, Tokyo,
                         106, Japan
SOURCE:                  Journal of the Physical Society of Japan (
                         1997), 66(4), 1066-1073
                         CODEN: JUPSAU; ISSN: 0031-9015
```

PUBLISHER: Physical Society of Japan
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Exciton energy levels and corresponding optical spectra are calcd. in carbon **nanotubes** (CN) in the conventional screened Hartree-Fock approxn. within a k.cntdot.p scheme. The Coulomb interaction gives rise to several exciton bound states as well as the increase of the energy gap. The exciton energy is shifted to higher energy side than the unperturbed band gap because the effect on the band gap is larger. The considerable amt. of the optical intensity is transferred to exciton bound states because of the one-dimensional nature of CNs.

CC 65-3 (General Physical Chemistry)
Section cross-reference(s): 76

ST exciton carbon **nanotube** energy level; band gap optical spectrum carbon **nanotube**

IT Band gap
Bound state
Dielectric function
Electric conductivity
Electrostatic potential
Energy
Energy level
Hartree-Fock method
Nanotubes
Spectra
Wave function
(excitons in carbon **nanotubes**)

IT Exciton
(in carbon **nanotubes**)

IT 7440-44-0D, Carbon, **nanotubes**, properties
(exciton energy levels and optical spectra)

=> d l43 1-17 cbib abs hitind

L43 ANSWER 1 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
2000:765250 Document No. 133:337250 Filament, method for inducing electric current in the same and processing of the same.. Chang, Yueh Kang; Iijima, Sumio (NEC Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2000302424 A2 20001031, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1999-147041 19990416.

AB The title filament is characterized by irradiating **electromagnetic** wave on at least a part of a filament component for deforming the filament. The filament component is a **nanotube**. The **nanotube** is a single wall **nanotube**. The **nanotube** has a bundle structure. The **nanotube** is a carbon **nanotube**. The **nanotube** is a single wall carbon **nanotube** (SWCNT). The filament is characterized by irradiating **electromagnetic** wave on at least a part of a filament component for selectively inducing an elec. current. The processing method is characterized

by irradiating **electromagnetic** wave on at least a part of a filament component for deforming the filament. The **electromagnetic** wave is visible light. The method is esp. useful for inducing elec. current in a filament having nanometer-grade microstructure and processing the same for micromachine and electron source.

IC ICM C01B031-02
ICS B01J019-12; D01F009-12

CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 76, 78

ST filament current inducing **electromagnetic** wave irradn; deformation filament processing **electromagnetic** wave irradn; carbon **nanotube** current inducing processing deformation; micromachine carbon **nanotube** current inducing processing; electron source carbon **nanotube** current inducing processing; single wall carbon **nanotube** current inducing processing

IT **Nanotubes**
(carbon; filament and method for inducing elec. current in same and processing of same)

IT Electric current
Filaments
Nanotubes
(filament and method for inducing elec. current in same and processing of same)

IT **Electromagnetic** wave
(irradn. of; filament and method for inducing elec. current in same and processing of same)

IT Deformation (mechanical)
(of **nanotube**; filament and method for inducing elec. current in same and processing of same)

IT 7440-44-0, Carbon, properties
(**nanotubes**; filament and method for inducing elec. current in same and processing of same)

L43 ANSWER 2 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
2000:435057 Document No. 133:158487 Carbon **nanotubes** and **nanotube**-based nanodevices. Lu, Jian Ping; Han, Jie (Department of Physics and Astronomy, University of North Carolina, Chapel Hill, NC, 27599, USA). International Journal of High Speed Electronics and Systems, 9(1), 101-123 (English) **1998**. CODEN: IHSSEF. ISSN: 0129-1564. Publisher: World Scientific Publishing Co. Pte. Ltd..

AB Carbon **nanotubes** exhibit unusual electronic and mech. properties which vary with subtle changes in microstructure, applied **electromagnetic** field, and mech. deformations, and introduction of topol. defects. These novel properties offer unprecedented opportunities to study fundamental physics, fabricate advanced compn. materials, and construct quantum devices on a nanometer scales.

CC 76-14 (Electric Phenomena)

ST carbon **nanotube** quantum nanometer scale device

IT Quantum devices
(carbon **nanotubes** and **nanotube**-based nanodevices)

IT **Nanotubes**
(carbon; carbon **nanotubes** and **nanotube**-based nanodevices)

L43 ANSWER 3 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
2000:399645 Production method of cathode and cathode, electron gun. [Machine Translation].. Sakurai, Hiroshi (Matsushita Electronics Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2000164112 A2 20000616, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1998-337149 19981127.

AB [Machine Translation of Descriptors]. Be as low as possible voltage the impression namely the electronic irradiation points, the electronic irradiation whose efficiency is good is obtained at small electrical field strength as in the cathode for vacuum where the **electromagnetic** radiation ingredient consists of the carbon **nano- tube**, stability electric current control is obtained. Heating the carbon **nano- tube** 2 which is an **electromagnetic** radiation ingredient of the cathode for vacuum with heater, 10 in vacuum container 5 the thermoelectronic irradiation point to the electron 6, or simultaneously thermoelectricity boundary makes emit with anode 3 including the electrical field. Furthermore when uses, as the electron gun the cathode for this kind of vacuum, opposes to this and consists with the first electrode and the second electrode which possess the transmitted hole of the electron, trial ode operates.

IC ICM H01J001-14
ICS H01J001-15; H01J001-20; H01J001-304; H01J003-02; H01J009-02; H01J009-04; H01J037-073

L43 ANSWER 4 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
2000:145101 Document No. 132:188765 Device for measuring a gaseous medium in a storage container. Schutz, Walter (Mannesmann A.-G., Germany). PCT Int. Appl. WO 2000011438 A1 20000302, 30 pp. DESIGNATED STATES: W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (German). CODEN: PIXXD2. APPLICATION: WO 1999-DE2503 19990806. PRIORITY: DE 1998-19838664 19980819.

AB Disclosed is a device for measuring the level of a medium, e.g. hydrogen, in a storage container pertaining to a storage device, e.g. a tank system. The device is configured as a measuring device that measures the NMR of the medium contained in the storage container to provide a simple and direct way of detg. the level of the storage container in a precise manner even when an unknown amt. of medium has been discharged or irresp. of uncontrollable losses.

The device has a measuring head with, for instance, a permanent magnet and a measuring coil which are used to generate a static magnetic field and an **electromagnetic** alternating field in the measuring head. The **electromagnetic** alternating field is generated in a transmitter that is connected to the measuring head by means of a bridge circuit. The stored medium NMR values measured by the measuring head are processed via the bridge circuit and an amplifier in a display device and are displayed. A corresponding storage device and a suitable method of measurement are also described.

IC ICM G01F023-22
ICS G01N024-08; C01B003-00

CC 77-8 (Magnetic Phenomena)
Section cross-reference(s): 52

IT Nanostructures
(carbon in the form of nano-fibers, **nanotubes** or nano-shells; device for measuring a gaseous medium in a storage container)

L43 ANSWER 5 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

1998:815659 Document No. 130:173226 Channeling of fast charged and neutral particles in **nanotubes**. Zhevago, N. K.; Glebov, V. I. (Russian Research Centre "Kurchatov Institute", Moscow, 123182, Russia). Physics Letters A, 250(4-6), 360-368 (English) **1998**. CODEN: PYLAAG. ISSN: 0375-9601. Publisher: Elsevier Science B.V..

AB We present a theory to describe the propagation of relativistic charged particles, X-rays and thermal neutrons through straight or slightly bent **nanotubes** and calcd. the spectra of **electromagnetic** radiation accompanying the channeling of charged particles.

CC 65-4 (General Physical Chemistry)
Section cross-reference(s): 73

ST channeling fast charged neutral particle **nanotube** **electromagnetic** radiation spectrum; x ray fast charged neutral particle **nanotube** channeling; carbon **nanotube** channeling fast charged neutral particle **electromagnetic** radiation; neutron charged particle channeling carbon **nanotube**

IT **Nanotubes**
(carbon; channeling of fast charged and neutral particles in **nanotubes** and spectrum of accompanying **electromagnetic** radiation)

IT Charged particles
Electromagnetic wave
Electron beams
Ion beams
Particles
Potential energy
X-ray
(channeling of fast charged and neutral particles in **nanotubes** and spectrum of accompanying

electromagnetic radiation)

IT Momentum
(transverse; channeling of fast charged and neutral particles in **nanotubes** and spectrum of accompanying **electromagnetic** radiation)

IT 12585-85-2, Positron 12586-31-1, Neutron
(channeling of fast charged and neutral particles in **nanotubes** and spectrum of accompanying **electromagnetic** radiation)

published afterwards.

L43 ANSWER 6 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN

1998:657887 Document No. 129:347388 Wires of seven atoms - Feynman's very, very small world. Broglia, Ricardo A. (Dipartmento di Fisica, Universita degli Studi di Milano and Istituto Nazionale di Fisica Nucleare, Sezione di Milano, Milan, 20133, Italy). Contemporary Physics, 39(5), 371-376 (English) **1998**. CODEN: CTPHAF. ISSN: 0010-7514. Publisher: Taylor & Francis Ltd..

AB A review with 13 refs. The properties of finite many-particle systems do not depend so much on the nature of the particles themselves or the forces acting among them, but on the fact that they are confined and that they are many. In particular, it is well known that the **electromagnetic** response of finite systems, like the at. nucleus is strongly influenced by the shape of the system, and by the spill-out of the nucleons from the nuclear surface. In fact, one has obsd. a conspicuous enhancement of the long-wavelength photo-absorption cross-section in the case of strongly deformed nuclei and of halo nuclei, as compared to the corresponding quantity assocd. with spherical nuclei lying along the stability valley. Because metals tend to be highly absorbing at long-wavelengths (visible and IR), the above results clearly suggest that nanometer wires have to be searched among finite at. systems where electrons feel a strongly deformed mean field, which allows for a conspicuous spill-out of the particles from its surface. Among the systems satisfying these requirements, single-wall **nanotubes** and linear carbon chains seem to be particularly promising. In fact, we have found from ab initio calcns. that they behave as metallic needles when subject to an **electromagnetic** field. We have furthermore obsd. that, under std. bias conditions, linear carbon chains are prolific emitters of electrons, the assocd. currents vs. voltage curves displaying a behavior typical of metallic systems. Single-wall **nanotubes** and linear carbon chains are thus likely to constitute the ultimate at.-scale quantum wires.

CC 65-0 (General Physical Chemistry)
Section cross-reference(s): 70, 76

ST quantum wire carbon chain **nanotube** review; electron emitter carbon chain review; **electromagnetic** response quantum wire carbon review; field emission carbon chain **nanotube** review

IT **Nanotubes**
Nanotubes
(carbon fibers; quantum wires, carbon chains and

nanotubes)
IT Carbon fibers, properties
Carbon fibers, properties
(**nanotube**; quantum wires, carbon chains and **nanotubes**)
IT Chemical chains
Electric current-potential relationship
Electric potential
Electron density
Field emission
Quantum wire devices
(quantum wires, carbon chains and **nanotubes**)
IT Fullerenes
(quantum wires, carbon chains and **nanotubes**)

L43 ANSWER 7 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1998:460344 Document No. 129:186387 A new twist on protein crystallization. Darst, Seth A. (Rockefeller University, New York, NY, 10021, USA). Proceedings of the National Academy of Sciences of the United States of America, 95(14), 7848-7849 (English) **1998**. CODEN: PNASA6. ISSN: 0027-8424. Publisher: National Academy of Sciences.
AB This article deals with the helical crystn. of proteins on **nanotubes** as introduced by **E. M.** Wilson-Kubalek, et al. (1998).
CC 9-16 (Biochemical Methods)
Section cross-reference(s): 6, 75

6|98

L43 ANSWER 8 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1998:381501 Document No. 129:61912 Formation of Titanium Oxide **Nanotube**. Kasuga, Tomoko; Hiramatsu, Masayoshi; Hoson, Akihiko; Sekino, Toru; Niihara, Koichi (Electrotechnology Applications R & D Center, Chubu Electric Power Co. Inc., Nagoya, 459, Japan). Langmuir, 14(12), 3160-3163 (English) **1998**. CODEN: LANGD5. ISSN: 0743-7463. Publisher: American Chemical Society.
AB **Nanotubes** composed of various materials such as carbon, boron nitride, and oxides were studied recently. The discovery of a new route for the synthesis of a **nanotube** made of titanium oxide is presented. Needle-shaped TiO2 crystals (anatase phase) with a diam. of .apprxeq.8 nm and a length of .apprxeq.100 nm were obtained when sol-gel-derived fine TiO2-based powders were treated chem. (e.g., for 20 h at 110.degree.) with a 5-10 M NaOH aq. soln. It was found by observation using a transmission electron microscope that the needle-shaped products have a tube structure. The TiO2 **nanotubes** have a large sp. surface area of .apprxeq.400 m2g-1. TiO2 **nanotubes** obtained in the present work are anticipated to have great potential for use in the prepn. of catalysts, adsorbants, and deodorants with high activities, because their sp. surface area is greatly increased. If metallic-, inorg.-, or org.-based materials can be inserted into the TiO2 **nanotubes**, novel characteristics such as elec.,

electromagnetic, or chem. properties may be induced in the TiO2 materials.

CC 78-2 (Inorganic Chemicals and Reactions)
ST titanium oxide **nanotube** prepn
IT **Nanotubes**
Surface area
(prepn. and increased surface area of titanium oxide **nanotubes**)
IT 13463-67-7P, Titanium oxide (TiO2), preparation
(**nanotubes**; prepn. and increased surface area of titanium oxide **nanotubes**)

L43 ANSWER 9 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1997:521323 Document No. 127:174898 .beta.APP gene transfer into cultured human muscle induces inclusion-body myositis aspects. Askanas, Valerie; Mcferrin, Janis; Alvarez, Renate B.; Baque, Susanna; Engel, W. King (Neuromuscular Center, Department of Neurology, Good Samaritan Hospital, University of Southern California School of Medicine, Los Angeles, CA, 90017-1912, USA). NeuroReport, 8(9-10), 2155-2158 (English) **1997**. CODEN: NERPEZ. ISSN: 0959-4965. Publisher: Rapid Science Publishers.

AB Direct transfer of the .beta.-amyloid precursor protein (.beta.APP) gene into cultured normal human muscle, using recombinant adenovirus vector, was sufficient to induce several of the typical light microscopic, electron microscopic (**EM**), and **EM** -immunochem. aspects of the inclusion-body myositis (IBM) phenotype, including congophilia, clusters of amyloid-.beta.-pos. 6-10 nm filaments, and 15-21 **nm tubulofilamentous** inclusions in the nuclei. The results suggest that excessive prodn. of intracellular .beta.APP may play an important role in the pathogenic cascade leading to the IBM phenotype.

CC 14-11 (Mammalian Pathological Biochemistry)
Section cross-reference(s): 3

no nanotube

L43 ANSWER 10 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:340438 Principal waves in multiply connected waveguides: concentration of laser radiation on areas of subwavelength dimensions. Zuev, V. S.; Frantsesson, A. V. (Fizicheskii Institut im. P.N. Lebedeva, Moscow, 117924, Russia). Kvantovaya Elektronika (Moscow), 23(3), 257-260 (Russian) **1996**. CODEN: KVEKA3. ISSN: 0368-7147. Publisher: Radio i Svyaz.

AB It is demonstrated that multiply connected waveguides can be used for the localisation or concn. of **electromagnetic** radiation at optical frequencies on areas of subwavelength transverse dimensions. In optical microscopes this makes subwavelength resoln. possible along all three spatial coordinates. The use of multiply coupled waveguides of subwavelength dimensions in the interaction of matter with laser radiation can increase considerably the field intensity in an optical wave. Applications of subwavelength waveguides in submicron photolithog., **nanotechnol**. for microelectronics, and optical data storage and retrieval are discussed.

L43 ANSWER 11 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1996:214040 Document No. 124:273421 Long wavelength optical response of incipient fullerene **nanotubes**. Roman, H. E.; Colo, G.; Alasia, F.; Broglia, R. A. (Institut fuer Theoretische Physik, Universitaet Giessen, Heinrich-Buff-Ring 16, Giessen, D-35392, Germany). Chemical Physics Letters, 251(1,2), 111-14 (English) **1996**. CODEN: CHPLBC. ISSN: 0009-2614. Publisher: Elsevier.

AB The **electromagnetic** response of elongated fullerenes is calcd. in the time-dependent local d. approxn. The long wavelength optical behavior of these systems is found to be very similar to that expected for the case of elongated metallic particles.

CC 73-4 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST fullerene **nanotube** long wavelength optical response

IT Energy level transition
    (long wavelength optical response of incipient fullerene **nanotubes**)

IT Fullerenes
    (long wavelength optical response of incipient fullerene **nanotubes**)

IT 115383-22-7, C70 Fullerene 145392-91-2, [5,6]Fullerene-C90-D5h(6) 175862-81-4, [5,6]Fullerene-C110-D5h
    (long wavelength optical response of incipient fullerene **nanotubes**)

L43 ANSWER 12 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1995:703207 Document No. 123:153182 Cavity quantum electrodynamics in a carbon **nanotube**. Davids, P.S.; Lerner, P.B. (Material Science and Technology Division, Los Alamos National Laboratory, Los Alamos, NM, 87545, USA). Physica D: Nonlinear Phenomena (Amsterdam, Netherlands), 83(1-3), 143-50 (English) **1995**. CODEN: PDNPDT. ISSN: 0167-2789.

AB An excited atom placed inside a metallic carbon **nanotube** cannot radiate if the frequency of its emission is below the cutoff frequency for **electromagnetic** wave propagation in the cavity. It can be de-excited through the emission of surface plasmons on the **nanotube**. The observable effect will be a substantial enhancement in the lifetime of dipole-allowed transitions. The lifetimes of excited states of Helium (2p .fwdarw. 1s) in the carbon nanocavities are calcd. for this nonradiative decay mechanism and the radial dependence of the lifetimes discussed.

CC 65-3 (General Physical Chemistry)
Section cross-reference(s): 73

ST quantum electrodynamics carbon **nanotube** cavity atom; emission excited atom carbon **nanotube** plasmon; helium excited emission carbon **nanotube** plasmon; lifetime excited atom carbon **nanotube** electrodynamics

IT Clusters
Plasmon

(quantum electrodynamics of excited atoms in carbon **nanotube**)
IT Fullerenes
(quantum electrodynamics of excited atoms in carbon **nanotube**)
IT Energy level
(excited, quantum electrodynamics of excited atoms in carbon **nanotube**)
IT Energy level transition
(nonradiative, quantum electrodynamics of excited atoms in carbon **nanotube**)
IT Energy level transition
(radiative, quantum electrodynamics of excited atoms in carbon **nanotube**)

L43 ANSWER 13 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1995:525325 Document No. 122:274555 Suppression of atomic radiation in a cylindrical nanocavity. Davids, P. S.; Lerner, P. B. (Materials Division, Los Alamos National Laboratory, Los Alamos, NM, 87545, USA). Zeitschrift fuer Physik D: Atoms, Molecules and Clusters, 33(3), 203-10 (English) **1995**. CODEN: ZDACE2. ISSN: 0178-7683. Publisher: Springer.
AB An excited atom placed inside a cylindrical nanocavity cannot radiate if the frequency of emission is below the cutoff frequency for **electromagnetic** wave propagation in the cavity. However, we demonstrate that it can be de-excited through the emission of surface plasmons. The observable effect will be a substantial enhancement in the lifetime of double-allowed transitions. The recently discovered carbon **nanotubules** will be explored as potential nanometer scale cylindrical cavities and the lifetimes of excited states of Helium (2p .fwdarw. 1s) in the carbon nanocavities will be calcd. as an example of this nonradiative decay mechanism. The dependence of the transition rate as a function of the radial distance from the tube surface is studied by varying the initial radial quantum no. of the center-of-mass wavefunction for an atom confined within the **nanotube**. The results of the calcn. are used to explore the possible application of concentric carbon **nanotube** structures as TEM waveguides.
CC 65-5 (General Physical Chemistry)
Section cross-reference(s): 73
IT Atoms
Electromagnetic wave
Energy level transition
Radiation
(suppression of at. radiation in a cylindrical nanocavity)

L43 ANSWER 14 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1995:500467 Document No. 123:43464 Scalable fabrication and optical characterization of nm Si structures. Zauidi, Saleem H.; Chu, An-Shyang; Brueck, S. R. J. (Cent. High Technol Maters., Univ New Mexico, Albuquerque, NM, 87131, USA). Materials Research Society

Symposium Proceedings, 358(Microcrystalline and Nanocrystalline Semiconductors), 957-68 (English) **1995**. CODEN: MRSPDH. ISSN: 0272-9172. Publisher: Materials Research Society.

AB Observations of efficient room temp. photoluminescence (PL) from porous Si have generated a great deal of interest in the optical properties of nm-scale Si structures. The stochastic character of porous-Si fabrication results in a distribution of crystal size and shapes. The authors report on a scalable (to large areas) and manufacturable (to high vols.) fabrication **technol**. for uniform, **nm**-linewidth Si structures providing an important tested for controlled studies of these optical properties. Large areas (.apprx.1 cm2) of extreme sub-.mu.m structures (to .apprx.5 nm) are reproducibly fabricated. Both walls (1-dimensional confinement) and wires (2-dimensional confinement) are reported. The fabrication process includes: interferometric lithog., highly anisotropic KOH etching, and structure dependent oxidn. For the walls, nearly perfect <111> crystal planes form the sidewalls and very high width/depth aspect ratios (>50) were achieved. Raman scattering results on the walls demonstrate 3 regimes: (1) lineshapes and cross sections similar to bulk Si for line widths, W > 200 nm; (2) **electromagnetic** resonance enhancement of the cross section (to .apprx. 100x) for W from 50-200 nm; and (3) highly asym. lineshapes and splittings from W < 30 nm. Photoluminescence is obsd. for the thinnest samples (W .ltorsim. 10 nm) and is as intense as that obsd. from porous Si with a spectral linewidth .apprx. 50% smaller than that of porous Si.

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

L43 ANSWER 15 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN no nanotube

1995:211 Document No. 122:227034 Scanning microsensors for **nanotechnology**. Stedman, M. (National Physical Laboratory, Teddington Middlesex., TW11 0LW, UK). Sensors and Actuators, A: Physical, 37-38(1-6), 11-15 (English) **1993**. CODEN: SAAPEB. ISSN: 0924-4247.

AB A discussion with 13 refs. on one of the most significant developments in the realm of **nanotechnol**. during the 1980s, the invention of the scanning tunnelling microscope. This event triggered the evolution of a whole family of scanning probe microscopes (SPMs), all based on the use of proximal microsensors with very high lateral as well as vertical resolns., which even allow atoms to be imaged. The properties sensed range from quantum tunnelling currents, through interat. and van der Waals forces, to the evanescent **electromagnetic** field. The principal application is imaging by the measurement of topog., but for many of the microsensors interaction with the surface is dependent on material properties, thus allowing a spectroscopic mode of use as well. The principles of several microsensors and assocd. SPMs are examd. The requirements for the traceable calibration of SPMs are discussed, and progress towards the development of calibration artifacts presented.

CC 75-0 (Crystallography and Liquid Crystals)

ST review scanning microsensor **nanotechanol**
IT Sensors
(scanning; for **nanotechnol**.)

L43 ANSWER 16 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1994:232855 Document No. 120:232855 Oriented polycrystalline thin films of transition metal chalcogenides. Tenne, Reshef; Hodes, Gary; Margulis, Lev (Israel). Eur. Pat. Appl. EP 580019 A1 **19940126**, 16 pp. (English). CODEN: EPXXDW. APPLICATION: EP 1993-110852 19930707. PRIORITY: IL 1992-102440 19920708; IL 1993-104513 19930126.
AB A method of prepg. a polycryst. thin film or nested polyhedra of circular or **nanotubular** cross-section of a transition metal chalcogenide which includes: (a) depositing a layer of a transition metal material or mixts. thereof on the substrate; and (b) heating the layer in a gaseous atm. contg. .gtoreq.1 chalcogen materials for a time sufficient to allow the transition metal material and the chalcogen material to react and form the oriented polycryst. thin film.
IC C30B025-02; C23C014-06; C23C14 -58; C23C008-08
CC 75-1 (Crystallography and Liquid Crystals)
Section cross-reference(s): 49
IT Electrodeposition and Electroplating
Electromagnetic wave
Ion beams
Sputtering
(for forming thin films of transition metal chalcogenides)

adds to conductivity.

no nanotube

L43 ANSWER 17 OF 17 HCAPLUS COPYRIGHT 2003 ACS on STN
1993:654178 Document No. 119:254178 Science and technology in composite materials. Nano-structure-controlled magnetic materials. Kugimiya, Koichi (Cent. Res. Lab., Matsushita Electr. Ind. Co., Ltd., Moriguchi, 570, Japan). Seramikkusu, 28(6), 589-95 (Japanese) **1993**. CODEN: SERAA7. ISSN: 0009-031X.
AB A review with 11 refs. General aspects of nano-structure-controlled magnetic materials, prodn. process and conditions of the material based on Fe-Si-Al spherical grains are described. The application of preliminary oxidn. and hot-pressing techniques, and evaluation of **electromagnetic** and grain boundary characteristics of the material are outlined.
CC 55-0 (Ferrous Metals and Alloys)
ST review composite material magnetic oxidn; **electromagnetic** grain boundary material review
IT Composites
(science and **technol**. of **nano**
-structure-controlled)

(author search)


```
=> d l16 1-7 all

L16  ANSWER 1 OF 7  HCAPLUS  COPYRIGHT 2003 ACS on STN
AN   2003:593197  HCAPLUS
TI   Carbon nanotube based transparent conductive coatings
AU   Glatkowski, Paul J.
CS   Eikos Inc., Franklin, MA, 02038, USA
SO   International SAMPE Symposium and Exhibition (2003), 48(Advancing
     Materials in the Global Economy--Applications, Emerging Markets and
     Evolving Technologies, Book 2), 2146-2152
     CODEN: ISSEEG; ISSN: 0891-0138
PB   Society for the Advancement of Material and Process Engineering
DT   Journal
LA   English
CC   42 (Coatings, Inks, and Related Products)
AB   The use of carbon nanotube to impart elec. cond. to
     polymeric films and coatings while maintaining excellent optical
     transparency is presented.  Examples and data are provided for
     nanotube composite films and coatings exhibiting optical
     transparency useful for electrostatic dissipation and for relatively
     high cond. electrodes in consumer electronic applications.  Coating
     with optical transparency of 90%T and elec. resistivity of 200
     .OMEGA./.box. are formed using simple wet coating processes.  This
     technol. is compared to competitive coating materials.  The
     properties and processing advantages of Nanoshield technol. are
     finding use in com. and military applications such as touch screens,
     large area displays; and next generation flexible displays and solar
     voltaic collectors.
RE.CNT  5     THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
(1) Ball, P; New Scientist 1996, P28
(2) Dresselhaus, M; Carbon Nanotubes: Synthesis, Structure, Properties
    and Applications 2001
(3) Iijima, S; Nature 1991, V354, P56 HCAPLUS
(4) Saito, R; Physical Properties of Carbon Nanotubes 1998
(5) Yakobson, B; American Scientist 1997, V85

L16  ANSWER 2 OF 7  HCAPLUS  COPYRIGHT 2003 ACS on STN
AN   2003:242250  HCAPLUS
DN   138:279880
TI   Electrostatic dissipative coatings for use with spacecraft
IN   Glatkowski, Paul J.; Connell, John W.; Landis, David H.,
     Jr.; Smith, Joseph G., Jr.; Piche, Joseph W.
PA   Eikos, Inc., USA
SO   PCT Int. Appl., 48 pp.
     CODEN: PIXXD2
DT   Patent
LA   English
IC   ICM  B64G001-00
     ICS  B64G001-14; C01B031-00; B05D001-12
CC   76-14 (Electric Phenomena)
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Section cross-reference(s): 38, 42, 52
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003024798	A1	20030327	WO 2002-US29307	20020917

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI US 2001-322728P P 20010918

AB The present invention relates to the use of electrostatic dissipative (ESD) coatings. Particularly, the invention relates to ESD coatings comprising **nanotubes** for use on spacecraft. The invention utilizes advantageous properties of carbon **nanotubes** to incorporate elec. cond. into space durable polymeric layers without degrading optical transparency, solar absorptivity or mech. properties. In this way, carbon **nanotubes** are utilized within the context of space durable polymeric layers and films as a means of achieving sufficient elec. cond. to mitigate static charge buildup. The surface has layer which includes a plurality of C **nanotubes** to incorporate elec. cond. into space durable polymeric layers without degrading optical transparency, solar absorptivity or mech. properties. Accordingly, the instant invention provides, in a preferred embodiment, a spacecraft comprising a surface defining at least a portion of the spacecraft, in which the surface comprises a layer of **nanotubes** effective for electrostatic discharge. Preferably the spacecraft is a gossamer spacecraft, which may be solar sails, antennas, sun shields, rovers, radars, solar concentrators, or reflect arrays. Preferably, the **nanotubes** may be single-walled **nanotubes** (SWNT), double-walled **nanotubes** (DWNT), multi-walled **nanotubes** (MWNT), or mixts. thereof. Preferably, the **nanotubes** are present in the layer at .apprx.0.001 to .apprx.1% based on wt. The **nanotubes** may also be oriented. Preferably, the layers or films have a surface resistance in the range of .apprx.105 to .apprx.1012 .OMEGA./square. Preferably the surface resistance is in the range .apprx.107 to .apprx.1010 .OMEGA./square.

ST electrostatic dissipative coating material spacecraft

IT Synthetic rubber, uses
(acrylonitrile; electrostatic dissipative coatings for use with spacecraft)

IT **Nanotubes**
(carbon; electrostatic dissipative coatings for use with

spacecraft)
IT Coating process
(dip; electrostatic dissipative coatings for use with spacecraft)
IT Antennas
Conducting polymers
Gravure printing
Ink-jet printing
Radar
Screen printing
Solar concentrators
Space vehicles
(electrostatic dissipative coatings for use with spacecraft)
IT Acrylic rubber
Fluoropolymers, uses
Gelatins, uses
Peptides, uses
Polyamides, uses
Polycarbonates, uses
Polyesters, uses
Polyethers, uses
Polyimides, uses
Polynucleotides
Polysaccharides, uses
Polysulfides
Polyurethanes, uses
Synthetic rubber, uses
(electrostatic dissipative coatings for use with spacecraft)
IT Coating materials
(electrostatic dissipative; electrostatic dissipative coatings for use with spacecraft)
IT Electric discharge
(electrostatic, preventative coatings; electrostatic dissipative coatings for use with spacecraft)
IT Coating process
(spin; electrostatic dissipative coatings for use with spacecraft)
IT Coating process
(spray; electrostatic dissipative coatings for use with spacecraft)
IT Plastics, uses
(thermoplastics; electrostatic dissipative coatings for use with spacecraft)
IT Plastics, uses
(thermosetting; electrostatic dissipative coatings for use with spacecraft)
IT 87186-94-5, SRS CP 1
(CP 1; electrostatic dissipative coatings for use with spacecraft)
IT 79062-55-8, SRS CP 2
(CP 2; electrostatic dissipative coatings for use with spacecraft)

IT 1398-61-4, Chitin 9002-86-2, Polyvinyl chloride 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-53-6, Polystyrene 9004-34-6, Cellulose, uses 252007-34-4, TOR LM 503269-48-5, TOR-NC
(electrostatic dissipative coatings for use with spacecraft)
IT 7440-44-0, Carbon, uses
(**nanotube**; electrostatic dissipative coatings for use with spacecraft)
RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE

(1) Barrera; WO 0192381 A1 2001 HCAPLUS
(2) Glatkowski; US 6265466 B1 2001 HCAPLUS
(3) Nahass; US 5643502 A 1997 HCAPLUS
(4) Shibuta; US 5908585 A 1999 HCAPLUS
(5) Speckman; US 6027673 A 2000 HCAPLUS
(6) Tokyo Univ; JP 10-088256 A 1998 HCAPLUS

L16 ANSWER 3 OF 7 HCAPLUS COPYRIGHT 2003 ACS on STN
AN 2003:118188 HCAPLUS
DN 138:160831
TI Conformal conductor coatings comprising carbon **nanotubes** for electromagnetic interference shielding
IN **Glatkowski, Paul J.**; Landrau, Nelson; Landis, David H., Jr.; Piche, Joseph W.; Conroy, Jeffrey
PA Eikos, Inc., USA
SO PCT Int. Appl., 36 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM H05K
CC 73-11 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 38, 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003013199	A2	20030213	WO 2002-US23413	20020724
	WO 2003013199	A3	20030522		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI US 2001-307885P P 20010727
AB The invention is directed to conformal coatings that provide

excellent shielding against electromagnetic interference (EMI). A conformal coating comprises an insulating layer and a conducting layer contg. elec. conductive material. The insulating layer comprises materials for protecting a coated object. The conducting layer comprises materials that provide EMI shielding such as C black, C buckyballs, C **nanotubes**, chem.-modified C **nanotubes** and combinations thereof. The insulating layer and the conductive layer may be the same or different, and may be applied to an object simultaneously or sequentially. Accordingly, the invention is also directed to objects that are partially or completely coated with a conformal coating that provides EMI shielding.

ST carbon **nanotube** electromagnetic interference shield coating

IT Polyimides, uses
(CP 1; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT Polysiloxanes, uses
(HumiSeal 1C49; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT **Nanotubes**
(carbon; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT Medical goods
(catheters; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT Accelerometers
Antioxidants
Binders
Conducting polymers
Crosslinking agents
Dielectric films
Dispersing agents
Dyes
Electric coils
Electromagnetic shields
Fiber optics
Flowmeters
Heat exchangers
Integrated circuits
Magnets
Photoelectric devices
Printed circuit boards
Sensors
Stabilizing agents
Transducers
UV stabilizers

(conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT Acrylic polymers, uses
Carbon black, uses
Chalcogenides
Epoxy resins, uses
Fullerenes
Gelatins, uses
Polycarbonates, uses
Polyesters, uses
Polynucleotides
Polysaccharides, uses
Polyurethanes, uses
Proteins
Rubber, uses
(conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT Films
(elec. conductive; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT Electric conductors
(films; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT Prosthetic materials and Prosthetics
(implants, artificial heart pacemaker; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT Heart
(pacemaker, artificial; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT Ceramic composites
(polymer; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT Plastics, uses
(thermoplastics; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT 58067-42-8D, Tetramethylxylylene diisocyanate, polymers
(TMXDI; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

IT 1398-61-4, Chitin 7440-02-0, Nickel, uses 7440-22-4, Silver, uses 7440-50-8, Copper, uses 9002-86-2, Polyvinyl chloride 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-53-6, Polystyrene 9004-34-6, Cellulose, uses 13840-40-9, Phosphine oxide 25038-59-9, Polyethylene terephthalate, uses 25722-33-2, Parylene 33294-14-3, FR4 35141-30-1D, DETA, polymers

494853-12-2, HumiSeal 1A37HV 494853-23-5, HumiSeal 1B73
494853-24-6, HumiSeal 1A20
(conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)
IT 7440-44-0, Carbon, uses
(**nanotubes**; conformal conductor coatings comprising carbon **nanotubes** and polymers for electromagnetic interference shielding)

L16 ANSWER 4 OF 7 HCAPLUS
AN 2002:964422 HCAPLUS
DN 138:48464
TI Nanocomposite dielectrics and their uses
IN **Glatkowski, Paul J.**; Arthur, David J.
PA Eikos, Inc., USA
SO PCT Int. Appl., 33 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C08J009-32
CC 76-10 (Electric Phenomena)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002100931	A1	20021219	WO 2002-US17891	20020610

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	US 2003008123	A1	20030109	US 2002-165306	20020610
PRAI	US 2001-296480P	P	20010608		

AB The dielec. const. is increased by dispersion of carbon **nanotubes** in polymers. The carbon **nanotubes** are optionally coated with metals such as Ag, Au, Ni, Al, or their mixts., optionally mixed with a conductive filler such as Ag, Ni-coated graphite, metal-coated glass beads, metal-coated hollow glass or ceramic spheres, Cu, stainless steel fibers, carbon black, Au, Al, or their mixts., and optionally oriented parallel to the elec. field of the nanocomposite. The **nanotubes** are optionally mixed with inorg. dielec. particles or coated with org. mols. to increase the vol. resistivity. These composites are useful as high-energy-d. capacitors and antennas. These composites may be laminated with metals such as Cu and reinforced with glass fabric for incorporation into a multilayer circuit to form an embedded

capacitor.

ST composite carbon **nanotube** polymer high energy density capacitor; glass fabric reinforced carbon **nanotube** polymer composite; multilayer circuit carbon **nanotube** polymer composite; copper laminate carbon **nanotube** polymer composite; org mol coated carbon **nanotube** polymer composite; inorg filler carbon **nanotube** mixt polymer composite; conductive filler carbon **nanotube** mixt polymer composite; antenna polymer carbon **nanotube** composite; dielec const enhanced polymer carbon **nanotube** filler; metal coated carbon **nanotube** polymer composite

IT Capacitors
(high-energy-d.; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT Glass spheres
(hollow glass spheres, metal-coated, supplementary cond. filler; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT Laminated plastics, uses
(metal laminates of nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors in multilayer circuits)

IT Glass beads
(metal-coated, supplementary cond. filler; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT Antennas
Integrated circuits
Nanocomposites
Nanotubes
(nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT Acrylic polymers, uses
Epoxy resins, uses
Fluoropolymers, uses
Polycarbonates, uses
Polycyanurates
Polyesters, uses
Polyimides, uses
Polymer blends
Polysiloxanes, uses
Polyurethanes, uses
(nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT Metals, uses
(**nanotube** coating and nanocomposite laminating materials; nanocomposites with increase dielec. const. based on

carbon **nanotubes** dispersed in polymers for
high-energy-d. capacitors and antennas)

IT Alloys, uses
Organic compounds, uses
(**nanotube** coating; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT Glass fiber fabrics
(reinforcing materials; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT Ceramics
(spheres, hollow, metal-coated, supplementary cond. filler; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT Metallic fibers
(stainless steel, supplementary cond. filler; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT Carbon black, uses
(supplementary cond. filler; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT Inorganic compounds
(supplementary filler; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT 12597-68-1, Stainless steel, uses
(fibers, supplementary cond. filler; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-17-2, Polybutadiene
(nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT 7429-90-5, Aluminum, uses 7440-02-0, Nickel, uses 7440-22-4, Silver, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses
(**nanotube** coating; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT 7440-44-0, Carbon, uses
(**nanotubes**; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

IT 7782-42-5, Graphite, uses
(nickel-coated, supplementary cond. filler; nanocomposites with increase dielec. const. based on carbon **nanotubes** dispersed in polymers for high-energy-d. capacitors and antennas)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Crowley; US 6038060 A 2000
(2) Glatkowski; US 6265466 B1 2001 HCAPLUS
(3) Horcom Limited; EP 0949199 A1 1999 HCAPLUS
(4) Jin; US 6250984 B1 2001 HCAPLUS
(5) Jin; US 6283812 B1 2001 HCAPLUS
(6) Niu; US 6205016 B1 2001 HCAPLUS
(7) Ren; WO 9965821 A1 1999 HCAPLUS
(8) Taylor-Smith; US 5965202 A 1999 HCAPLUS
(9) Tennent; US 6031711 A 2000 HCAPLUS

L16 ANSWER 5 OF 7 HCAPLUS
AN 2002:754298 HCAPLUS
DN 137:281428
TI Coatings containing carbon **nanotubes**
IN **Glatkowski, Paul J.**
PA Eikos, Inc., USA
SO PCT Int. Appl., 55 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM B32B005-16
ICS C01B011-04
CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 42
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002076724	A1	20021003	WO 2002-US9140	20020326

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	US 2003122111	A1	20030703	US 2002-105623	20020326
PRAI	US 2001-278419P	P	20010326		
	US 2001-311810P	P	20010814		
	US 2001-311811P	P	20010814		
	US 2001-311815P	P	20010814		

AB Elec. conductive films contg. **nanotubes** demonstrate excellent cond. and transparency. Methods of prepg. and using the films are disclosed.
ST elec conductive film carbon **nanotube**
IT **Nanotubes**
(carbon; elec. conductive coatings contg. carbon

nanotubes)

IT Composites
(ceramics hybrid with polymers; elec. conductive coatings contg. carbon **nanotubes**)

IT Antioxidants
Binders
Coating materials
Coloring materials
Conducting polymers
Crosslinking agents
Dispersing agents
Electric conductors
Fillers
Plasticizers
Semiconductor materials
Softening agents
Stabilizing agents
Surfactants
UV stabilizers
(elec. conductive coatings contg. carbon **nanotubes**)

IT Chalcogenides
Polycarbonates, uses
Polyesters, uses
Polyimides, uses
Polynucleotides
Polysaccharides, uses
Polyurethanes, uses
Rubber, uses
(elec. conductive coatings contg. carbon **nanotubes**)

IT Carbon black, uses
(elec. conductive coatings contg. carbon **nanotubes**)

IT Fullerenes
(elec. conductive coatings contg. carbon **nanotubes**)

IT Gelatins, uses
(elec. conductive coatings contg. carbon **nanotubes**)

IT Oxides (inorganic), uses
(elec. conductive coatings contg. carbon **nanotubes**)

IT Films
(elec. conductive; elec. conductive coatings contg. carbon **nanotubes**)

IT Electric conductors
(films; elec. conductive coatings contg. carbon **nanotubes**)

IT Ceramics
(hybrid with polymers; elec. conductive coatings contg. carbon **nanotubes**)

IT Peptides, uses
(polypeptides; elec. conductive coatings contg. carbon **nanotubes**)

IT Plastics, uses
(thermoplastics; elec. conductive coatings contg. carbon

nanotubes)

IT 1314-13-2, Zinc oxide, uses
(Aluminum-doped; elec. conductive coatings contg. carbon **nanotubes**)

IT 1332-29-2, Tin oxide
(Fluorine-doped; elec. conductive coatings contg. carbon **nanotubes**)

IT 465511-21-1, Titanium SI-DETA
(ceramic polymer composite; elec. conductive coatings contg. carbon **nanotubes**)

IT 100-42-5, Styrene, uses 1398-61-4, Chitin 9002-86-2, Polyvinyl chloride 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9004-34-6, Cellulose, uses 13840-40-9, Phosphine oxide 25038-59-9, Polyethylene terephthalate, uses
(elec. conductive coatings contg. carbon **nanotubes**)

IT 791-28-6, Triphenyl phosphine oxide 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7439-95-4, Magnesium, uses 7439-96-5, Manganese, uses 7439-97-6, Mercury, uses 7440-02-0, Nickel, uses 7440-06-4, Platinum, uses 7440-22-4, Silver, uses 7440-32-6, Titanium, uses 7440-36-0, Antimony, uses 7440-41-7, Beryllium, uses 7440-43-9, Cadmium, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 7440-66-6, Zinc, uses 12597-69-2, Steel, uses 12673-86-8, Antimony-tin oxide 50926-11-9, Tin-indium oxide
(elec. conductive coatings contg. carbon **nanotubes**)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Tennent; US 6099965 A 2000 HCAPLUS
(2) The University Of North Carolina; WO 0051936 2000 HCAPLUS
(3) Weber; US 6350516 B1 2002

L16 ANSWER 6 OF 7 HCAPLUS COPYRIGHT 2003 ACS on STN
AN 2002:754187 HCAPLUS
DN 137:280267
TI Carbon **nanotubes** in structures and repair compositions
IN **Glatkowski, Paul J.**; Landis, David H., Jr.; Piche, Joseph W.; Conroy, Jeffrey L.
PA Eikos, Inc., USA
SO PCT Int. Appl., 13 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM A61K009-14
ICS A61K033-44; B05D005-12; B32B005-16; H01B001-24
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002076430	A1	20021003	WO 2002-US9142	20020326

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

US 2002180077 A1 20021205 US 2002-105622 20020326

PRAI US 2001-278417P P 20010326

AB A method for repairing fiber-reinforced composite structures while maintaining original EM and lightning protection using carbon **nanotubes**, fibers, and thermoset resins is disclosed. According to one embodiment of the invention, the method comprises prepg. a damaged area for repair; prepg. a repair patch for the damaged area, the repair patch comprising **nanotubes**; applying the repair patch to the damaged area; and curing the repair patch. A repair patch for a composite structure having a conductive layer is disclosed. According to one embodiment of the present invention, the repair patch includes a binder and **nanotubes**. A repair resin for repairing a composite structure having a conductive layer is disclosed. According to one embodiment of the present invention, the repair layer includes a resin and **nanotubes**. A putty for repairing a composite structure having a conductive layer is disclosed. According to one embodiment of the present invention, the putty includes a base and elec. conductive carbon **nanotubes**.

ST carbon **nanotube** composite elec cond lightning protection

IT Putty
(carbon **nanotubes** in structures and repair compns.)

IT Reinforced plastics
(carbon **nanotubes** in structures and repair compns.)

IT **Nanotubes**
(carbon, elec. conductive; carbon **nanotubes** in structures and repair compns.)

IT Electric apparatus
(housings; carbon **nanotubes** in structures and repair compns.)

IT Aircraft
Automobiles
(parts; carbon **nanotubes** in structures and repair compns.)

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Anon; JP 01022982 A 1989 HCAPLUS
(2) Krassowski; US 6395199 B1 2002 HCAPLUS
(3) Tennent; US 6099965 A 2000 HCAPLUS
(4) Weber; US 6350516 B1 2002

AN 2001:537507 HCAPLUS
DN 135:108422
TI Electromagnetic shielding composite comprising **nanotubes**
IN **Glatkowski, Paul**; Mack, Patrick; Conroy, Jeffrey L.; Piche, Joseph W.; Winsor, Paul
PA Eikos, Inc., USA
SO U.S., 8 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM G21F001-10
NCL 523137000
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 76
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6265466	B1	20010724	US 1999-250047	19990212
	US 2002035170	A1	20020321	US 2001-894879	20010629
PRAI	US 1999-250047	A1	19990212		

AB An electromagnetic shielding composite having **nanotubes** and a method of making the same are disclosed. According to one embodiment of the present invention, the composite for providing electromagnetic shielding includes a polymeric material and an effective amt. of oriented **nanotubes** for EM shielding, the **nanotubes** being oriented when a shearing force is applied to the composite. According to another embodiment of the present invention, the method for making an electromagnetic shielding includes the steps of (1) providing a polymer with an amt. of **nanotubes**, and (2) imparting a shearing force to the polymer and **nanotubes** to orient the **nanotubes**. The shielding effect is achieved by absorption of electromagnetic radiation, allowing formation of an insulating composite. The composites are useful for lowering radar observability of objects.
ST electromagnetic shield **nanotube** composite
IT **Nanotubes**
(carbon, Graphite Fibrils; electromagnetic shielding composite comprising **nanotubes**)
IT Electric insulators
Electromagnetic shields
(electromagnetic shielding composite comprising **nanotubes**)
IT Polycarbonates, uses
Polyesters, uses
Polyimides, uses
Polyurethanes, uses
(electromagnetic shielding composite comprising **nanotubes**)
IT **Nanotubes**

(oriented; electromagnetic shielding composite comprising **nanotubes**)

IT Plastics, uses
(thermoplastics; electromagnetic shielding composite comprising **nanotubes**)

IT Plastics, uses
(thermosetting; electromagnetic shielding composite comprising **nanotubes**)

IT 9002-86-2, Polyvinyl chloride 9002-88-4, Polyethylene 9003-07-0, Polypropylene 25038-59-9, polyethylene terephthalate, uses
(electromagnetic shielding composite comprising **nanotubes**)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE
(1) Bennett; US 5547525 1996 HCAPLUS
(2) Koruga; US 5640705 1997 HCAPLUS
(3) Shibuta; US 5853877 1998